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DIESEL PROGRESS



FEBRUARY, 1944 FIVE DOLLARS PER YEAR—FIFTY CENTS PER COPY

Piston- Packin' Diesel

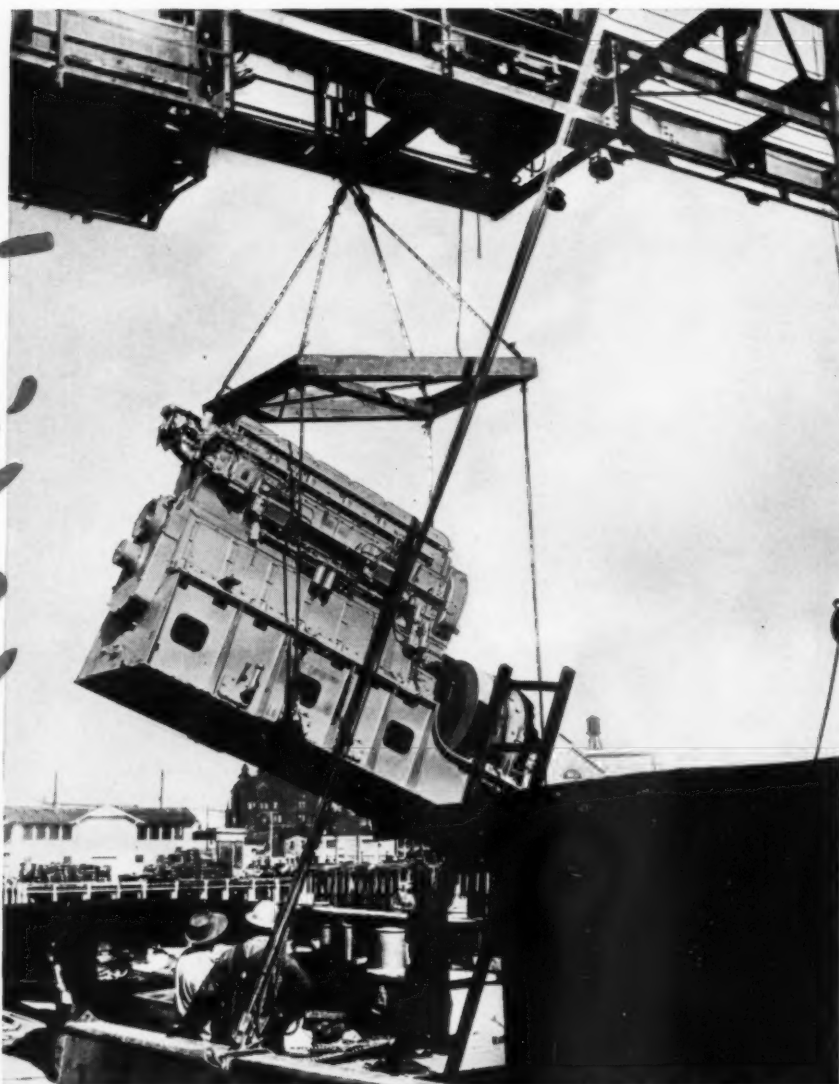


Photo courtesy of The Cooper-Bessemer Corporation

ANOTHER Diesel goes into a ship. Since 1938 more Diesel hp. has been installed in ships than the total Diesel hp. in existence in the U. S. prior to that period.

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TUNE IN FRED ALLEN EVERY SUNDAY NIGHT — CBS



HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

DIESEL PROGRESS, for February, 1944. Volume X, Number 2. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth St., New York, 19, N. Y. Rex. W. Wadman, President. Acceptance under the Act of June 5, 1943, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates; \$5.00 per year, single copy, 50c.



DIESEL and GAS ENGINE PROGRESS

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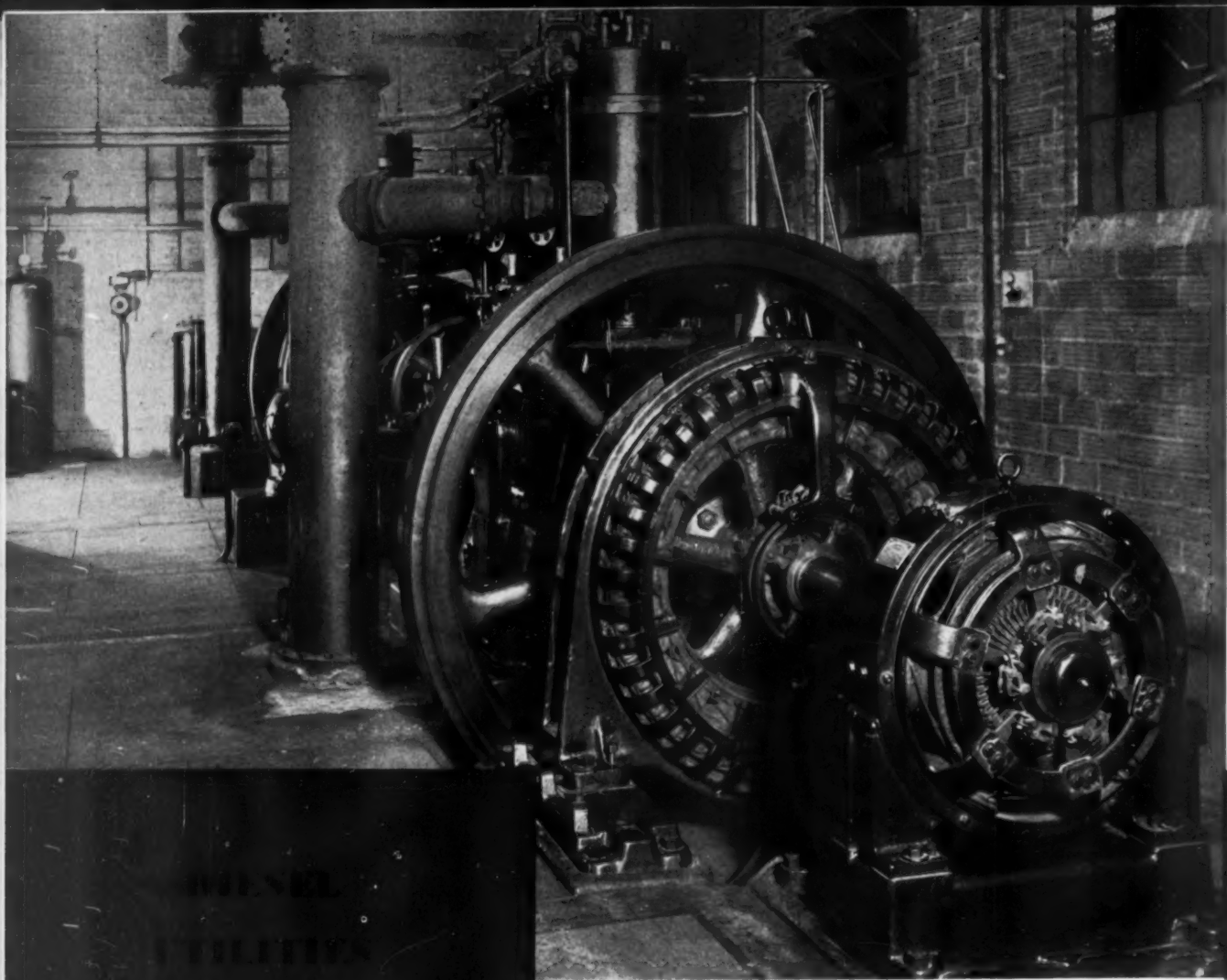
FRONT COVER ILLUSTRATION: Swing of 38 sleds averaging 6,700 board feet each, behind a Caterpillar Diesel tractor on 15-mile haul for Las Pas Lumber Co. Manitoba. Note water tank behind tractor, used to ice the roadway.

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Two of the earlier Fairbanks-Morse Diesels at Fairhope. The foreground unit is a 2-cylinder, 120 hp. engine.

The colony of Fairhope was founded many years ago, largely by Iowans, and is located on the eastern shore of busy Mobile Bay. The first hardy settlers of the colony, put into effect the "Single Tax Plan" which later gained national fame. This plan meant essentially that only improvements to land were taxed and not the land itself. The "Single Tax Plan" has been modified constantly to meet changing conditions, but the citizens of Fairhope will tell you that theirs is still probably the lowest tax rate in the state. A little research will reveal low taxes were always the rule, notwithstanding the extensive publicly owned improvements which now greet the eye on every hand—for they have been realized through sound management of town funds over the years. And these publicly owned improvements continue to grow, year after year.

Officials of Fairhope are agreed that taxes are and will always be necessary but they also contend that taxes need never be a millstone around the necks of the people. Instead they look upon taxes as a highly effective instrument

to insure the public health, safety, happiness and progress.

A conservative 10 mill tax is in effect at this time on a total assessment of \$1,500,000.00. One half of all collections go into the general fund while the other half is used for public improvements, etc. Mr. Yahn, city clerk, advises that more than 95% of all taxes were collected in 1942 and says he expects to miss a 100% collection in 1943 by less than 1%!!! Truly a record to be proud of.

Money derived from their low tax rate contributed to the purchase of equipment for the town's first water system. As far back as 1916 the colony owned and operated its own water and light plant, starting out with two oil engines and two reciprocating type pumps. The story of Fairhope since that day is one of remarkable progress—50 hp. was ample for all its lighting and pumping in 1916, now 1075 hp. is required to satisfy the demands.

Almost all the credit must go to sound manage

FAIRHOPE, Alabama could be a typical small town—but it isn't!!! The city fathers, down through the years have consistently kept it out of this class. Fairhope is not typical because of many things; low taxes, good streets, excellent fire department, low insurance rates and a modern, efficiently operated light and water plant, being just some of the reasons.

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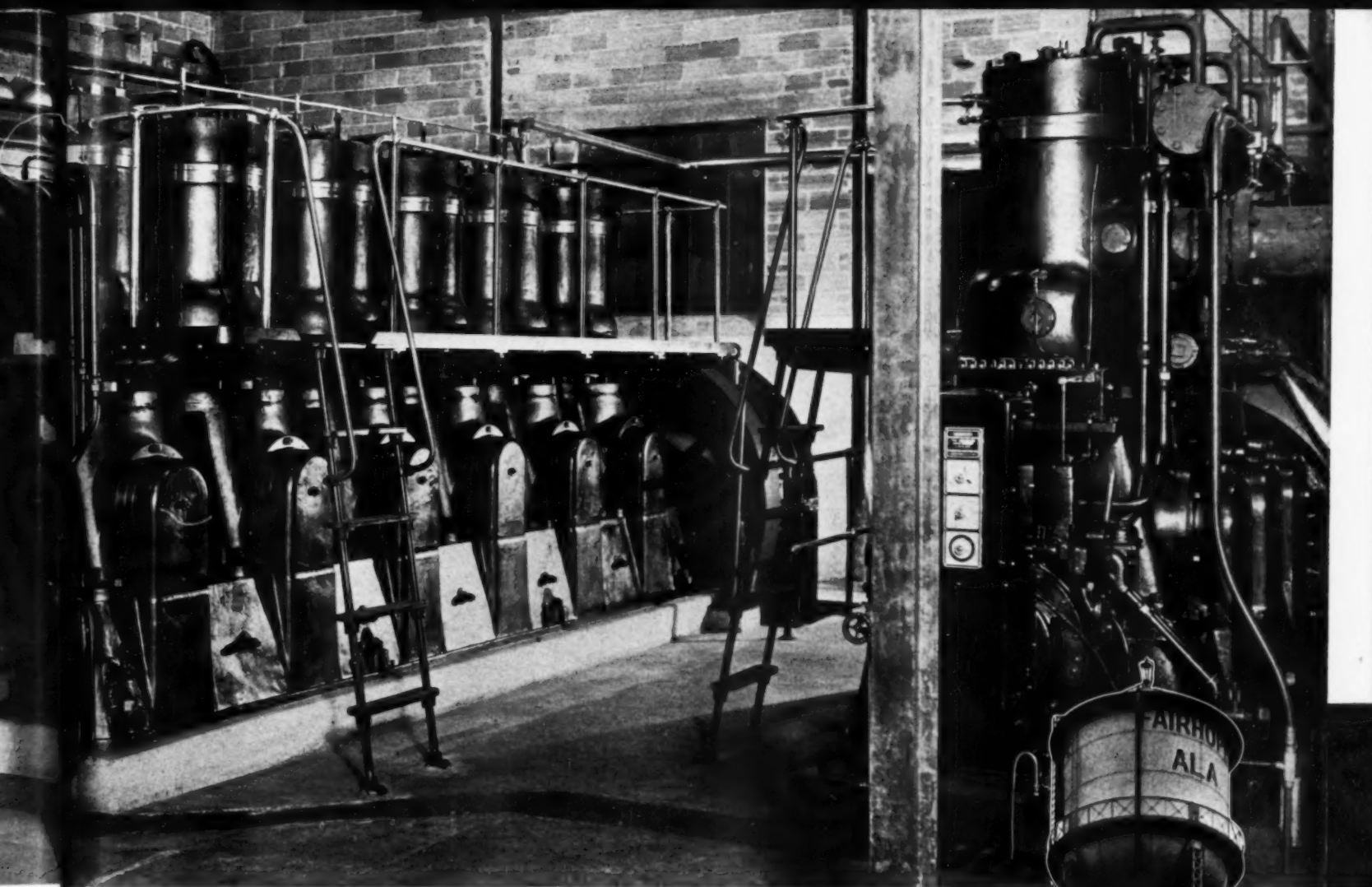
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15% discount



Left, a 6-cylinder, 450 hp.; and right, a 3-cylinder, 225 hp. unit, both F-M Diesels. Note Woodward governors on both engines. Below, exterior view of the Fairhope light and power plant.

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ment for this outstanding achievement because there had never been any sharp increase in population until 1941. Fairhope installed its latest engine in 1940. Census figures are not available for 1916, but it is interesting to note that with an increase in population of only 200 people from 1936 to 1940, Fairhope found it necessary to increase her light plant capacity from 300 hp. to 1075 hp. Here are figures on this phenomenal growth of electrical demand.

NUMBER OF METERS IN

1937	1942
500	904

TOTAL KWH. OUTPUT

777,520	1,519,190
---------	-----------

KWH. OUTPUT PER METER

1548	1680
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Rates have always been low in Fairhope as you will note from the following table, but in addition to their low rates, a discount of 10% was made until 1942 on all bills that were paid promptly. In 1942 rates were further reduced by increasing this discount to 15%!

The following are current rates, all subject to 15% discount:

RESIDENCE

First	40 KWH. per mo. at 5½¢
Next	100 KWH. per mo. at 3¢
All over	150 KWH. per mo. at 2¢
Minimum charge of 1.11 which includes first 10 KWH.	

BUSINESS

First	50 KWH. per mo. at 5½¢
Next	50 KWH. per mo. at 3¢
All additional KWH.	per mo. at 2½¢



Above rates plus minimum charge which varies.

POWER

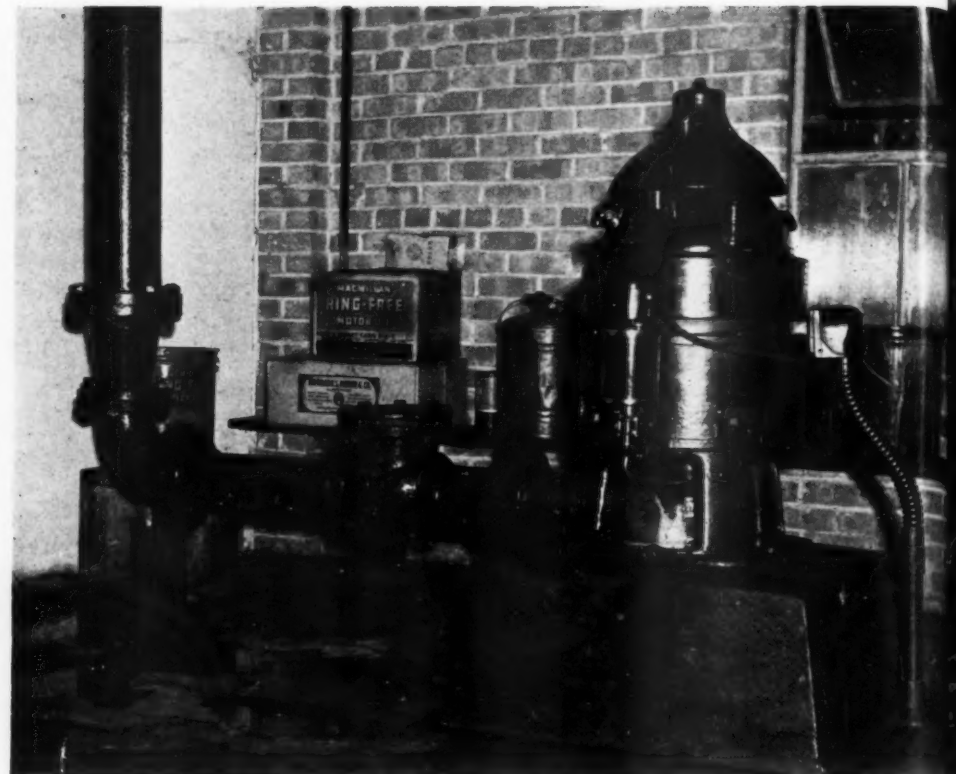
All up to 1,000 KWH. per mo. at 3.3c
 All up to 5,000 KWH. per mo. at 2.2c
 For next 15,000 KWH. per mo. at 1.1c
 For next 30,000 KWH. per mo. at 9.8 mills
 Above rates plus demand charge which varies.
 There is a small charge for water and a 50c monthly "rental" charge for Sewage facilities. When the bonds are retired on the sewage system this charge will be withdrawn. There is no charge made for current for street lighting, for water pumping, or for the lighting of public buildings, schools and churches.

This includes the famous Organic School of Education, an endowed institution, which during its 30 years of successful teaching has received liberal contributions from Henry Ford and other famous Americans. The school has attracted the attention of educators everywhere principally for the reason that the traditional "term examination" has no part in its system of teaching.

Chief Engineer, Ray Stapleton who has practically grown up with the Light and Water Plant, says the name "Fairbanks-Morse" is synonymous with Fairhope's growth and prosperity. Fairbanks-Morse was called upon to furnish the power and pumping machinery for the town's original plant, which at that time was located down by the edge of the Bay. There were two pumps in the first plant, both were reciprocating type and were driven by 25 hp. Fairbanks-Morse horizontal oil engines. One of the old units—pump and engine—is still in operation today after 27 years of faithful duty.

This plant gave admirable service but the demand had increased to such an extent by 1925 that it was necessary to install a larger unit and a Fairbanks-Morse 180 hp. Diesel engine with direct-connected generator was placed in service. The colony during this period had grown from a sprawling settlement into a full-fledged town. Since the building housing the old 25 hp. oil engine was too small to accommodate additional machinery, a new power plant was constructed in the center of town and the new 180 hp. Diesel was installed with other equipment.

Three years later, in 1928, the citizens of Fairhope found themselves at the crossroads of their future. Misfortune hit in the form of a disastrous fire which destroyed their utilities buildings together with most of the machinery. At that time certain factions argued convincingly



View of the Fairbanks-Morse 200 gpm., 7 in. deep well pump, and 10 hp. vertical motor, serving the Fairhope water supply system.

for purchased power along with water and sewage facilities, and it seemed for a time their wish would prevail. Pride of public ownership had become deep rooted but that alone would not have defeated the opposition. Figures proved to be their downfall. Figures don't lie, and figures proved that the utilities, not only had given the town and people uninterrupted, economical service throughout its existence, but had, always operated at a profit. In the face of this, advocates of purchased power were defeated and plans were made immediately to build a new utilities plant.

A thorough check of damages to the machinery in the destroyed plant gave the town a real surge of hope for it was found that their 180 hp. Fairbanks-Morse Diesel was little damaged.

In very short time, it was rebuilt and put back into service—on its original foundation. According to Ray Stapleton that old 180 "saved the day" for the cause of public ownership. The record shows she ran night and day for nearly 15 months and was shut down just long enough each month for inspection. Ray says that never took longer than two hours, and away she would go again. This engine had earned a rest and

she got it, for after the new Light and Water plant was built, another Fairbanks-Morse unit was installed to help carry the load. The new engine was a 120 hp. Diesel direct-connected generating unit.

The cycle of major improvements to the town's public services had always taken from five to seven years—and seven years later, in 1935, the biggest of all improvements was made. Consumption of electricity had risen sharply, for it was in that period electric appliances began to make their appearance in great quantities. Toasters, electric irons, electric roasters, vacuum cleaners, heating pads, all of these and a hundred more became commonplace in every home.

They called for electricity at low cost and Fairhope provided it by purchasing its third Fairbanks-Morse Diesel—a 225 hp. back-flow scavenging unit complete with Fairbanks-Morse electrical equipment. The power plant building was enlarged to accommodate the new machine, as well as to provide room for additional pumping equipment.

It is significant to note that electric ranges enjoy wide popularity with Fairhope housewives. A

Receipts	\$49,059.25
Expense	21,270.56
Profit	27,788.69
GENERATION:	
Cost	\$ 5,102.00
Cost	7,379.86
Cost	682.67
Cost	2,683.91
Cost	123.41
Cost	186.66
Cost	50.51
Total Production Cost	\$16,209.02
DISTRIBUTION:	
Cost	\$ 2,511.14
Cost	251.48
Cost	135.04
Total Distribution Cost	\$ 2,897.66
OFFICE AND GENERAL:	
Cost	\$ 82.50
Cost	69,997
Cost	111,750
Cost	160,759
Cost	1,843,620
Cost	1,376,997
Cost	12
Cost	2,080
Cost	0.0047
Cost	854
Cost	1,624
Cost	81.76
Cost	46.31
Cost	26.52
Cost	15.02
Cost	3.25
Cost	480
Cost	100



Operating statement of the Fairhope plant for 1941.

One of two new fire pumps recently installed in the Fairhope plant, both F-M, 6 in. units with 60 hp. motors and G-E starter.

Water survey conducted by Westinghouse a year or so before the war revealed that there were more electric ranges per capita in Fairhope than in any other town in Alabama. Low cost of current and plenty of it is the reason.

The electrical problem seemed solved but the water supply as provided by the old waterworks down by the Bay was proving inadequate to supply increasing demands. Accordingly a new well was drilled next to the power plant in the heart of town. A Fairbanks-Morse 7 in., 6-stage turbine pump, driven by an F-M 10 hp. electric motor, was selected for the job. This pump is capable of pumping 200 gpm. either for direct service or for storage in the new 75,000 gallon steel overhead storage tank.

As insurance against another fire disaster to its utilities, and in keeping with its policy of public improvements, the town purchased modern fire fighting equipment and a volunteer fire department was organized. Two new fire pumps were required and again Fairbanks-Morse was called upon. Two 6 in. pumps driven by Fairbanks-Morse 60 hp. motors were recommended and purchased. Each unit will deliver, 1000 gpm. and there is always plenty of water for them to

draw on for there is a reservoir full of water—almost a quarter million gallons—waiting at all times.

Installation of these pumps were a great factor in the low insurance rates enjoyed by the towns people. After fire fighting facilities were completed, all insurance rates were cut squarely in half.

Fairhope, in addition to its fine waterworks, enjoys a highly efficient sewerage system. Pumps and motors in this plant are also Fairbanks-Morse. At present a small monthly charge of 50c per house is made for this service, but the charge will be withdrawn when the bonds are retired.

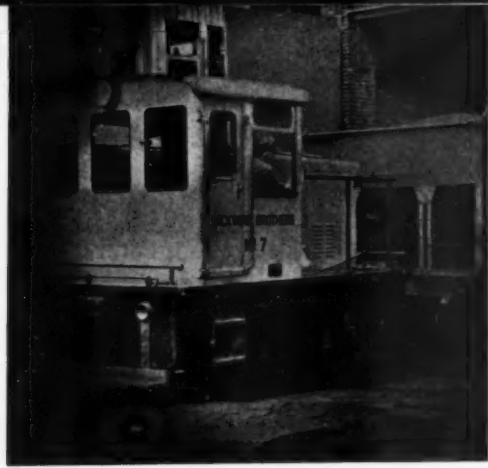
It would appear that the city fathers had insured the town's water, sewage and electrical requirements for years to come, but such was not the case, for just four years later in 1910, electrical demand had again exceeded the supply—but, again this progressive community had the answer, and funds realized from sound management were available to back their judgment. A survey was made and a fourth Diesel purchased—this time a 450 hp. six cylinder Fair-

banks-Morse direct-connected generating unit.

Two years later, the water supply, taxed by the demands of a big ice plant and a dairy, had fallen below capacity. To meet this situation a Fairbank-Morse 2 in. booster pump with a F-M 20 hp. motor was installed in the old well down by the Bay. This unit will deliver 150 gpm. and working with the old engine driven pump brings the supply of pure water in line with demand. Except for minor items here and there no additional equipment has been added to the plant since 1940, but the job it has to do is greatly increased both in volume and importance. Fairhope has absorbed its capacity of the overflow of war workers and their families from Mobile, where ships and other implements of War are being forged. The power plant is operating near peak capacity at all times and water and sewage facilities are being taxed to the limit.

The operating statement for 1941 shows that a very handsome profit of \$27,788.69 was realized for that year and in view of the fact that the sharp increase in population over the past two years has caused demand to increase proportionately, subsequent reports should be better.

By CHARLES C. WICKWIRE*



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Three views of the General Electric-built, Cummins engined, Diesel-electric 25 ton locomotive that replaced a 70-ton steamer in Wickwire Brothers plant.

IN December 1941, we obtained a 25-ton Diesel-electric locomotive for general yard duty to replace an old 70-ton steamer. It has turned out to be one of the best investments in plant equipment that we have ever made, and saved a large part of the purchase price of the locomotive in the first 18 months of operation. This saving was made principally in fuel costs, track maintenance, repairs and crew expense.

Our plant covers 35 acres, and has approximately 5 miles of track, mostly curves. Our work consists of switching about 60 outgoing and incoming cars per week of coal, steel, slag, scrap

President, Wickwire Brothers, Inc.

and the like, in addition to the movement of about 450 charging buggies per week. Previously we had used a 50-ton and a 70-ton steamer locomotive. Now we do the entire job with the 25-ton General Electric Diesel-electric locomotive which operates 24 hours a day. It is on duty all the time except from 11 P.M. Saturday to 11 P.M. Sunday when the mill shuts down. During this period we keep the locomotive in the boiler house. It handles general switching during the day and switches the open hearth night and day.

The little routine maintenance required is done during the week-end. It won't pull as big loads as the 70-ton steamer, but it is amazing the loads

that a 25-ton Diesel-electric will haul. It is very seldom that we have to split up a drag in our plant. We kept the 50-ton steamer for standby and have used it only six days in 18 months.

Our first most noteworthy saving was in fuel costs. The Diesel-electric used 1683 gallons of fuel oil in one three-month period, or about \$2.25 per 24-hour day, and we use the best fuel oil obtainable. The steamers use 14 tons of \$5 coal per week. This was a saving of about \$9.50 per day on fuel. Lube oil costs are about a stand off.

A large saving was made in labor. The Diesel-electric required only one man to operate it. The steamers required both an engineer and a fireman, on the day turn, so we saved the wages of one man at least in a 24-hour day, to say nothing of reduced maintenance and engine house expense. Even with one-man operation, the engineer has less to do than previously and now works in a comfortable cab out of the weather. But perhaps more important than reduced operating costs, we estimate the Diesel-electric made roughly 2500 extra man hours of labor per year available to use elsewhere in the plant. With labor hard to get, this is a great advantage.

We realized another big saving in track maintenance. This "saving" amounted to \$1000-\$1200 per year in labor alone. We had spent a considerable amount of money to repair our track particularly on the curves where the larger "steamers" spread the rails. After operating the Diesel for a year we found we had to do very little work on the track.

The fuel supply is quite simple with a Diesel-electric. We installed a 1200 gallon fuel tank and a metering pump near one of our tracks. Once every two days our locomotive pauses a few minutes while passing the pump and fills its 75 gallon tank—just like filling your automobile tank with gasoline. We buy the fuel by tank wagon from Syracuse. Lube oil is obtained and stored in the same manner as for our automobiles and trucks.

Comparing operating costs of a new Diesel-electric with an old steamer isn't strictly a true comparison. Maintenance expense is expected to increase as the Diesel-electric gets older.

Moreover, we have no idea of its useful life. However, on the basis of the savings it has made to date, we could junk it completely in five or six years and still enjoy a very handsome return on our original investment.



*C. F. Runchey, general manager
GM Diesel Equipment Division,
Grand Rapids, Michigan.*

LARGE SCALE

POST-WAR

DIESEL PRODUCTION

SEEN



*C. W. Truxell, chief engineer
of the new GM Division.*

A CHANGE which became effective January 1, assures that the Grand Rapids plant formerly operated by the Saginaw Steering Gear Division of General Motors, will be a permanent post-war industry, according to an announcement by R. K. Evans, vice-president of General Motors. The Grand Rapids plant will become an independent division of General Motors known as the Diesel Equipment Division. It will manufacture injectors for all General Motors Diesel engines. Manufacture of carbines, the present work of the Grand Rapids plant, will continue with injector manufacture until the carbine program is completed.

C. F. Runchey, formerly manager of the Grand Rapids plant, is general manager of the new division. C. W. Truxell, formerly of the engineering staff of the Detroit Diesel Engine Division, is chief engineer of the Diesel Equipment Division and brought with him from Detroit a staff of technical and production men. Plans for the new division require the post-war construction of a modern plant, designed to meet special problems in the manufacture of injectors. Operation will continue through the war in the present quarters in the former plant of the Irwin Peterson Arms Company.

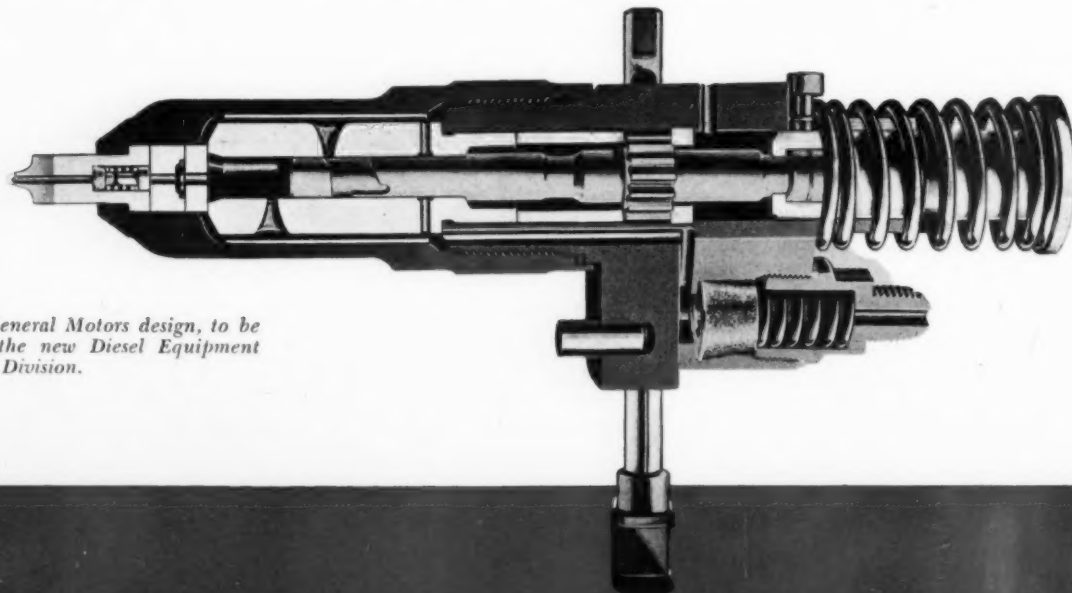
All injectors for the General Motors Diesel engines manufactured by the Cleveland Diesel Engine Division, at Cleveland, the Electro-Motive Division at LaGrange, Ill., as well as those which the Detroit Diesel Engine Division makes itself, have been manufactured by the Detroit Diesel Engine Division.

Continued increases in the requirements of the armed services for the products of the Detroit Division have resulted in the need for more capacity both in floor space and manpower; hence the transfer of this injector operation to a separate factory at Grand Rapids. This move also fits into future operating plans, in that it will permit the eventual return to the Detroit plant of many manufacturing operations which had to be farmed out to other General Motors divisions on a temporary basis during the war emergency. Mr. Evans pointed out that the prospects for high post-war continuity of employment in the new operation at Grand Rapids are exceptional because of the growth in application of the Diesel engine.

"These engines are at work in every phase of war activity except the powering of airplanes," Mr. Evans said. "We were congratulated re-

cently by the Navy upon having powered a great many of the landing boats, both large and small, which have figured in invasion operations from the Solomons and Alaska to Africa, Sicily and Salerno. In addition to the landing boat field some 4,000 U. S. Navy vessels such as submarines, submarine mother ships, subchasers of various sizes, tow boats, rescue boats, destroyer escort boats, mine layers, mine sweepers, fleet tenders, and the like are powered by large Diesels. On land thousands of the engines have gone into tanks, tractors, trucks and military buses, as well as in many such stationary or portable power applications as air compressing and generation of electricity for airport and hospital lighting, telephone systems and the like.

"One of the major fields of the Diesel engine for which the new Grand Rapids organization will make injection equipment which not only is highly active now but gives definite promise of even greater activity post-war is the Diesel locomotive business. Every class of railroad motive power service is covered by Diesel locomotives from switchers up to the passenger and freight locomotives which have established a whole new level of railroad service."



*Unit injector of General Motors design, to be
manufactured by the new Diesel Equipment
Division.*

JOHN DICKSON

PEERS INTO THE FUTURE

JOHAN DICKSON, chief engineer in charge of development, Detroit Diesel Engine Division of General Motors, in a paper delivered to The Lumberman's Congress in Seattle, Washington, January 20, gazed into the crystal ball and gave forth some startling prognostications. Yes, Mr. Dickson prophesied some vital developments—Dieselwise—but in fairness to him and his revelations let it be said that he was treading on ground very familiar to him. Following is the story as unfolded by John Dickson.

Two trends in design and application during the war will accelerate Diesel engine use after the war, John Dickson said in his paper delivered at the annual Pacific Logging Congress. First he cited the rapid trend toward the higher speed engines and second the equally rapid trend toward use of smaller, so-called high speed Diesels in multiple installations in place of single, heavy, large slow-speed Diesels.

Sounding a warning against expectation of radical innovations in Diesel design immediately post war, Mr. Dickson disclosed some wartime discoveries that may ultimately lead to an entirely new position in the power world for the Diesel type of engine. However, he foresaw immediately far wider application of Diesel post war than pre-war as a result of the war proven developments.

"I am convinced," said Mr. Dickson, "that post war power will be the engines that have been produced and developed during the war and will not be radical innovations suddenly thrust on the users of the engines as untried and undeveloped projects. Just as the ominous off-shore roar which warns Hitler that his hour of doom draws nigh comes chiefly from the throaty throb of thousands upon thousands of Diesel engines, so will the same engines, tried and tested in the fire of battle, be the ones to lead in the post war period.

"These engines are of the high speed type, compared with the larger and slower speed engine with which industry was, in general, more familiar prior to the war.

"Tremendous advances have been made in the production of Diesel engines. The demand has necessitated mass production methods. This should make the cost of the engine relatively

lower to the ultimate purchaser. It will enable the same unit engine to be used in multiplicity of applications. By this I do not mean that any one particular company or corporation will have a monopoly on the sale of engines, but that the user, for instance in the logging industry, will find it profitable to have in his tractors, scrapers, trucks, yarders and logging donkeys the same engine adapted to meet the different applications.

"I am further convinced that the trend will be towards using a multiplicity of engines combined, in many cases, to a single drive shaft, to take the place of the large, single, slow-speed engine. This has been a very definite trend with our Armed Forces. For instance, in tanks and tank destroyers it has been possible to apply multiple Diesel engines in the space originally designed and allotted for use with the radial air-cooled, aircraft gasoline engine. The same can be said of the Navy in its amphibious landing craft program. Here we see the same engine being applied to small boats using a single engine, up to the large size in which a combination of eight of these same engines in sets of four with the same size and power, have been utilized as the means of propulsion. Each set of four engines serves one of the twin propellers. Thus, I am convinced that the trend in post war power will be definitely towards the same bore and stroke. This will enable the manufacturer to pass on to the user the advantages of mass production, and at the same time will permit both the manufacturer and the user to benefit from the servicing and maintenance angle. Servicing parts should be relatively low in cost and readily obtainable—a factor which will reflect considerably on the ultimate earning power of the user's equipment.

"In the Logging industry where greater power is required for certain equipment than is afforded by the power of a single engine twin engines connected to a single drive shaft will be available. Similarly, say, with the fishing industry. It can be visualized where all fishing boats from the 20 footer up to the 150 foot tuna clipper can utilize unit engines, singly or in multiple combination. The failure of an engine would not necessitate the towing expense and weeks or months of delay which has occurred in the past while the engine is subjected to overhaul because, with a multiplicity of engines, the



John Dickson

*Chief Engineer in Charge of Development,
Detroit Diesel Engine Division, General Motors*

offending engine can be readily cut out as an operating unit relative to the others, permitting the ship to make its catch and return to port.

"The installation of a new engine would be the matter of an overnight job. In one of the Navy's vessels, a twin screw job, four engines have been combined onto a single shaft, making eight engines in all on the twin screws. This vessel can be operated with any combination of from one to eight engines. This is not an isolated, experimental vessel. Hundreds have been turned out and are being turned out."

Indicating the growth of Diesel production Mr. Dickson cited the fact that whereas the total Diesel production in America in 1940 was four and a half million horsepower, more than fifteen million horsepower of one small series American Diesel engine alone was produced in 1941, 42 and 43. He also cited the increase in horsepower, without increase in weight or size of this same engine, from 165 horsepower before the war to 225 horsepower today.

"This same engine," he said, "has developed in laboratory tests over 300 horsepower, while Diesel engineers can visualize the prospect of 450 horsepower without depending on the in-

And now please turn to page 62



Caterpillar Diesel tractor with Le Tourneau Angledozer working in rock on the Alaskan Highway. Official U. S. Army Signal Corps Photo.



Here, the Diesel tractor with LaPlant-Choate Trailbuilder is seen removing a sand bar in preparation for a pontoon bridge.

THE DIESEL- BUILT

THE words of General John J. Pershing concerning the United States Engineers on a certain job: "the scientists said it couldn't be done . . . the damn fool engineers didn't know that—so they just went ahead and did it!" can appropriately be applied again to these engineers in the construction of the Alaskan highway stretching across more than 1,600 miles from Dawson Creek, B. C. to Fairbanks, Alaska.

Formally opened November 20, 1942, this new "Road to Tokyo"—which had been dreamed of for many years by statesmen and scientists—permits transportation of troops and war material to Alaskan ports and is a springboard from

By BEN
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squeeze his
through rocks
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with everything
sleeping in ter
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Tractor and Angledozer spreading fill prior to final grading.

By BENNETT B. SMITH

which attacks will be launched to crush the Japanese Empire.

The road was grubbed through timber so thick in places that it was impossible for a man to squeeze his body between the tree trunks; through rocks and over water; across mountains and tundra. Engineers fought the wilderness with everything they had, often eating and sleeping in temperatures as low as 55 degrees below zero. But, with the help of modern mechanized equipment and thousands of men, the road was rushed to passability in eight months—far in advance of the dreams of engineers. The 35th Engineering Regiment pioneered the

way and were assisted by 54 contractors, 13 of whom were Canadian, directed by four managing contractors, and all under the direction of the United States Public Roads Administration.

Clearing, grading, and grubbing were all one rapid operation. A typical clearing outfit consisted of 6 to 20 heavy Diesel tractors equipped with bulldozers and many with winches for pulling one another out of difficulties. Usual custom was for one tractor to push on the line of the proposed clearing making a path, followed by the others making side-swipes to widen the path. Some form of grader followed the

clearing throwing earth to the center to smooth the road. Gravel was spread when at hand, thicknesses varying from 18 inches to a thin sweep.

Equipment of the 35th, which was typical, consisted of 20 heavy Diesel tractors and bulldozers; 6 pulled graders; 3 patrol graders; 6 rooter plows; 6, 12-yard carrying scrapers; 93 one-half ton dump trucks; a 6-ton prime mover truck; 7, 4-ton cargo trucks; 9, 2½-ton cargo trucks; 25 jeeps; 10 command cars; 1 sedan; 12, ¾-yard shovels.

In addition, smaller equipment included port-

able Diesel light plant; 1/2-yard concrete mixer; 315-foot portable compressor; 6 plows; 24 gas driven saws; 2 portable welding machines; several drop pile hammers. Diesel tractors played a major part in the Alcan construction and were secured from the four tractor building companies of the United States: Caterpillar, International, Allis-Chalmers, and LaPlant-Choate.

Equipment took great punishment and to keep it rolling was a big job. Parts were difficult to get and it was weeks before repairs began arriving. Ingenious mechanics kept the machines moving by often making repairs on the job.

The road the first year, while useable, was far from being permanent. Ice caused from seeping springs, made hazardous many places so that various methods were used to eliminate them.

Steam was used for melting the ice and oil barrels were made into stoves and placed at the ends of culverts to keep the drainage open. These burned for weeks in succession.

In January the temperature went from 70 to 76 degrees below zero and outside work was halted but plans were made for the work of the summer of 1943.

With the coming of spring, many bridges washed out and much gravel needed replacing. Supply lines from the States bottle-necked and the railroad, taxed with this unusual event, broke down many times.

Plans (plans were often changed) called for a roadway 24 feet wide with maximum wheel load in all weather of 10,000 pounds. Fifty-five permanent bridges were scheduled with many temporary ones; hills were cut down and much gravel and ballast spread. Estimates as late as August 1943 were that 5,663 acres would be cleared; 20,887,000 cubic yards of surfacing would be done; 375,000 lineal feet of culvert would be built. It was estimated that \$27,000,000 in new equipment would be needed. During the summer 915 Diesel tractors, 4,180 trucks, 330 scrapers, 214 shovels, and 228 motor graders were in operation.

During the present winter it is planned to maintain 1,008 miles of the road by private contractors on a fixed fee basis, other sections by hired labor. It is thought the cost of the road for the two years it has existed will not exceed \$115,000,000.



Transporting a Caterpillar Diesel tractor to a new location on the Alaskan Highway. Official Signal Corps Photo.



Grading goes on, left, while the gang eats its evening meal.

The going is easier at this point where the Highway skirts a mountain lake. Public Roads Administration, F.W.A. photo.

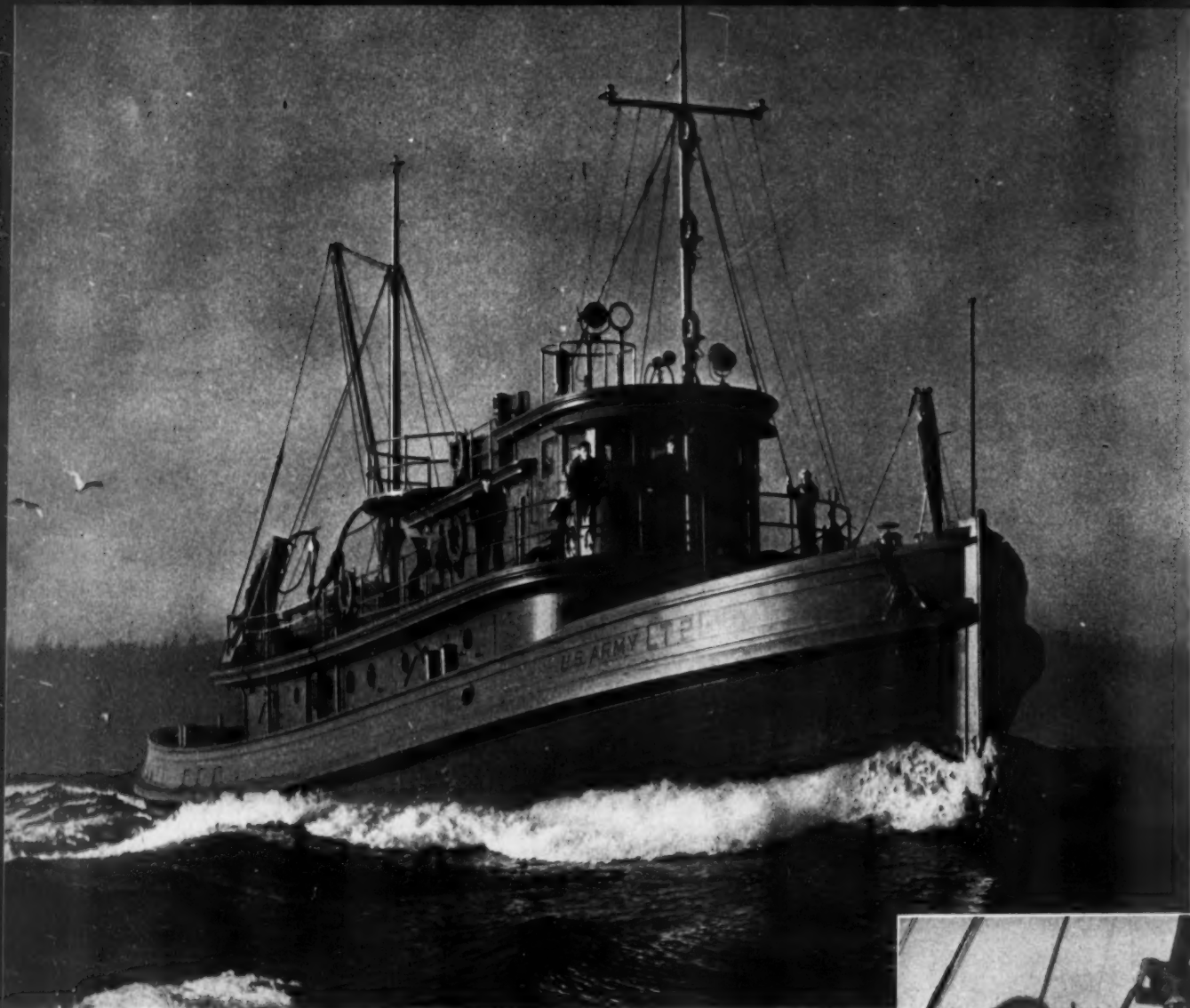




*Caterpillar Diesel tractors with Le Tourneau bulldozers pushing material into grizzly.
Official Signal Corps Photo.*

Grading at a campsite on the Alaskan Highway.





Army tug "LT214" on trial run in Commencement Bay, Tacoma Harbor, December 13, 1943.

FIRST BIG DIESEL TUG

By CHARLES F. A. MANN

BY June of this year, the Army Transportation Corps will have one of the biggest and finest fleets of Diesel tugs in all the world. Some say it will be the world's biggest fleet of wood and Diesel ships—making it even more of a Super proposition than to stop the definition at the word *tugs alone*. There is no doubt that the Army's huge and rapidly expanding "Navy" will outrank all the Army fleets operated by all other nations in the world put together.

The Public may rest secure in the knowledge that the Army isn't just building troop transports and a few landing barges, they're building with meticulous care and foresight an auxiliary fleet big enough, fast enough and armed well enough to shuttle not a few thousands but



Snapped on trial trip, left to right: Capt. Wellington Wm. L. Healy, Pres. of Puget Sound Boatbuilding Co. and George M. Ripley, U. S. Army Transportation Corps chief engineer of the new tug.



Left and right: John Petrich, Treasurer and J. D. Martinolich, Secretary of Puget Sound Boat Building Co. Center: Capt. S. B. Wellington, skipper of the "LT214" for the Army Transportation Corps.

FROM TACOMA FOR ARMY TRANSPORTATION CORPS

millions of troops and millions of tons of supplies, far out on every Pacific base in every theater of war. We aren't depending on anybody else to move our men and supplies, down to the last 18 man liferaft or 16 foot inspection or shore-leave dinghy.

To this end, we strongly recommend some of the Congressmen who love to give out sizzling interviews, particularly now that retrenchment has begun, to come to the North West Coast and look at the Army's latest brood of smaller ships—most of them "Big" for their class, and take a ride and see what they are getting for the money spent. It is not spilling a secret to remind readers of DIESEL PROGRESS that the Army gets more for its Ship Dollar than any

branch of the Government, the Maritime Commission coming next on its smaller fleet of service ships. (We haven't the nerve to discuss costs on the Liberty fleet of steamers—particularly steam powered operating costs *per mile*.)

Annually we remind the Marine industry of America about progress from Tacoma's 12 boat-yards, 100% busy in peace or War on building wood and Diesel ships for the seven seas. The end of 1943 showed four big yards busy on a fleet of 50 Army ships, either finished or in progress, and another yard finishing 12 steel and Diesel ships (little ones) likewise for the Army.

The four yards were turning out seventy-two 96 and 127 ft. Diesel tugs for the Army, both

branches, and the biggest of the 1943 output was the big twin screw 127 foot Diesel tug turned out by Puget Sound Boatbuilding Company, one of the finest of the newer-old yards on Puget Sound.

This yard was organized from a pool of two prominent shipbuilding and owning families known up and down the Coast in the fishing trade, and the resourceful Wm. L. Healy, young Tacoma businessman with a flair for boats and long connections in the marine insurance business.

Puget Sound Boatbuilding Company, headed by Mr. Healy, carries the name of two members of the Martinolich Family, the brothers J. D. and

Charles R. Martinolich, and father J. A. Martinolich, ace designer, architect and layout man who began building boats on Puget Sound 45 years ago. Chas. R. is Vice President and J. D. is Secretary. John Brescovich, noted operator, owner, broker and waterfront wizard in the fishing game is also vice president, and Mr. John Petrich, treasurer. The new yard, built two years ago, is on the outer end of City Waterway. Tacoma's maritime Wall Street, where five complete shipyards are all busy building wood and Diesel ships for Uncle Sam. The plant has its nearby affiliated machine shop and a big two-way covered building shed, with suitable dockage rail and highway facilities, not to mention a complete electrically heated two story office building, the only one of its kind in the Northwest. Tacoma's 3 mill electric power keeps the 20 kw. heating load going continuously for a total cost of 6 cents per hour! Readers served by steam-fired Public Service Co. of Podunk will please note!

The *LT214* is 126 ft. 8 inches overall length and 119 ft. at the waterline, and 28 ft. beam and 16 ft. moulded depth. The hull is heavily built of Douglas fir and Alaska cedar with framing 7 in. thick, double, spaced 23 inches on centers. The one piece Douglas fir keel, 14½ x 15 in. is another one of those legendary Paul Bunyans from the woods near Mt. Rainier National Park, 58 miles East of Tacoma, and it carries a 3 in. thick x 15 in. wide hardwood wearing shoe in case the boat ever lands on a rocky beach. Keelsons are 12½ in. x 15 in. and the engine beds 18 x 24 in. also of Douglas fir of the kind that makes shipbuilders' mouths water. First garboard planking is 5½ x 15 in.; 2nd 4½ x 15½ in. and hull planking 3½ in. thick single. Deckhouses are of 1¼ in. waterproof plywood for the main deck and ¾ in. waterproof ditto for the upper house. Three-quarters in. thick hardwood sheathing for working in ice extends 2½ ft. above and below waterline, from the bow to aft of midships. The boat is spiked, bolted and nailed to a degree that has absolutely eliminated destructive shaking that first characterized ships of this class built on the West Coast. Plans are adaptations from the original Mikkimikki Type designed by veteran L. H. Coolidge of Seattle 12 years ago for the Young Brothers of Honolulu, the world's first big-size twin screw Diesel tugs for offshore work.

Below, forward, is the chain locker for 105 fathoms of 1¼ inch link chain, with bosuns stores and paint locker above this space, followed by focsle quarters for 12 members of the crew. Aft of this are two welded fuel tanks.

Next follows the engine room, with the pair of 600 hp. Fairbanks Morse main Diesels and the twin Reiner Diesel auxiliary sets to supplement the very large electric load requirements.

Aft of the engine room, in the roomy Shaft Alley, are more fuel and lube tanks. The 3,000 gallon water tank is under the focsle floor. Two 30 in. x 96 in. welded steel air bottles are mounted on each side of the shaft alley, and the twin Frigidaire units are set atop the aft fuel tanks in this same space.

A Modern Electric Steering gear unit is fitted aft, driving the plate rudder. Lignum vitae stern bearings carry the power to two 71 x 37 in. three bladed Doran bronze propellers.

On the main deck forward is the big Duplex Anchor Windlass followed by the long deckhouse, with a mates room on the Port side and messroom starboard, followed by the galley with its oil fired Lang range, large double ice boxes one for ordinary storage and the other for low temperature storage, roomy working surfaces and lockers. The galley extends full width of the deckhouse except for an inside passageway leading to the engine room area. The upper engine room area, mostly steel grating floor, has the engineers operating stand, directly back of which is a passageway leading to the engineers quarters on the port side and toilet, shower and washrooms for everybody on the starboard.

Aft, forward of the rear deck, is the large single drum towing winch, powered with two 20 hp. National motors, capable of rolling up 1800 ft. of 1¾ in. steel cable.

The upper deck has the pilot house forward, complete with hand and electric steering; twin Weston tachometers, Liquidometer rudder angle indicator, Intervox 2-way radio, Bludworth direction finder and controls for signal and searchlights mounted atop this area. A connecting inside passageway leads to the radio and captain's room and room for four in the gun crew aft, as well as below to the main deck. The entire ship can be run from the "inside" without going on deck. Aft of the enclosure is a pair of lifeboats on davits, a 16 and an 18 footer, and two 15 man liferafts, with twin gun mounts aft.

The main propulsion plant consists of a pair of 6 cylinder Fairbanks Morse two cycle Diesels, each having their own built in scavenging pumps and delivering their power at 400 rpm. Cylinders are 12 x 15 in. and they are fresh water cooled, the built-in F.M. unit pumps

handling fresh water in a closed circuit through twin Ross heat exchangers, served by two Dayton Dowd seawater pumps, powered by Northwestern motors.

The big main Diesels have control stands in the conventional midsections below, with chain drive extending from the handwheels to the engineers control stand on the upper engine room level. The main engines are direct reversing and each carry a fully enclosed safety car heating belt driven generator off the flywheels, to provide for the heavy electric load. A 56 cell Exide battery set, 112 volts D.C. is fitted, as well as two 25 kw. Reiner auxiliary generator units, driven directly off two 40 hp. 3¾ x 4½ in. 6 cylinder Hercules Diesels, all battery and generator current being handled through an elaborate G.E. deadfront switchboard. A Honan Crane lube oil clarifier is fitted as well as a pair of small, compact Gardner Denver 2-stage auxiliary air compressors. When the auxiliary load is high, both auxiliary generators and the storage battery set is used to furnish electricity for the pump and deck machinery motors. Normal operation is handled from the belt driven generators off the main engines and the battery circuit.

A Sunray steam heating boiler is fitted under the stairway leading to the engine room floor as well as a 20 hp. Dayton Dowd fire pump and Waterous bilge pump. A 5 hp. Dayton Dowd standby pump is also fitted. A Roper fuel oil transfer and a Viking lube oil pump each with a ½ hp. motor and a Goulds hand operated fuel oil transfer pump are also fitted. Two Coolidge exhaust mufflers are fitted in the smokestack for the main and two smaller ones for the auxiliary Diesels.

A Perko 12 in. searchlight and a Curtis signal searchlight are fitted atop the pilot house. Also pyrometers are fitted for both main Diesel engines.



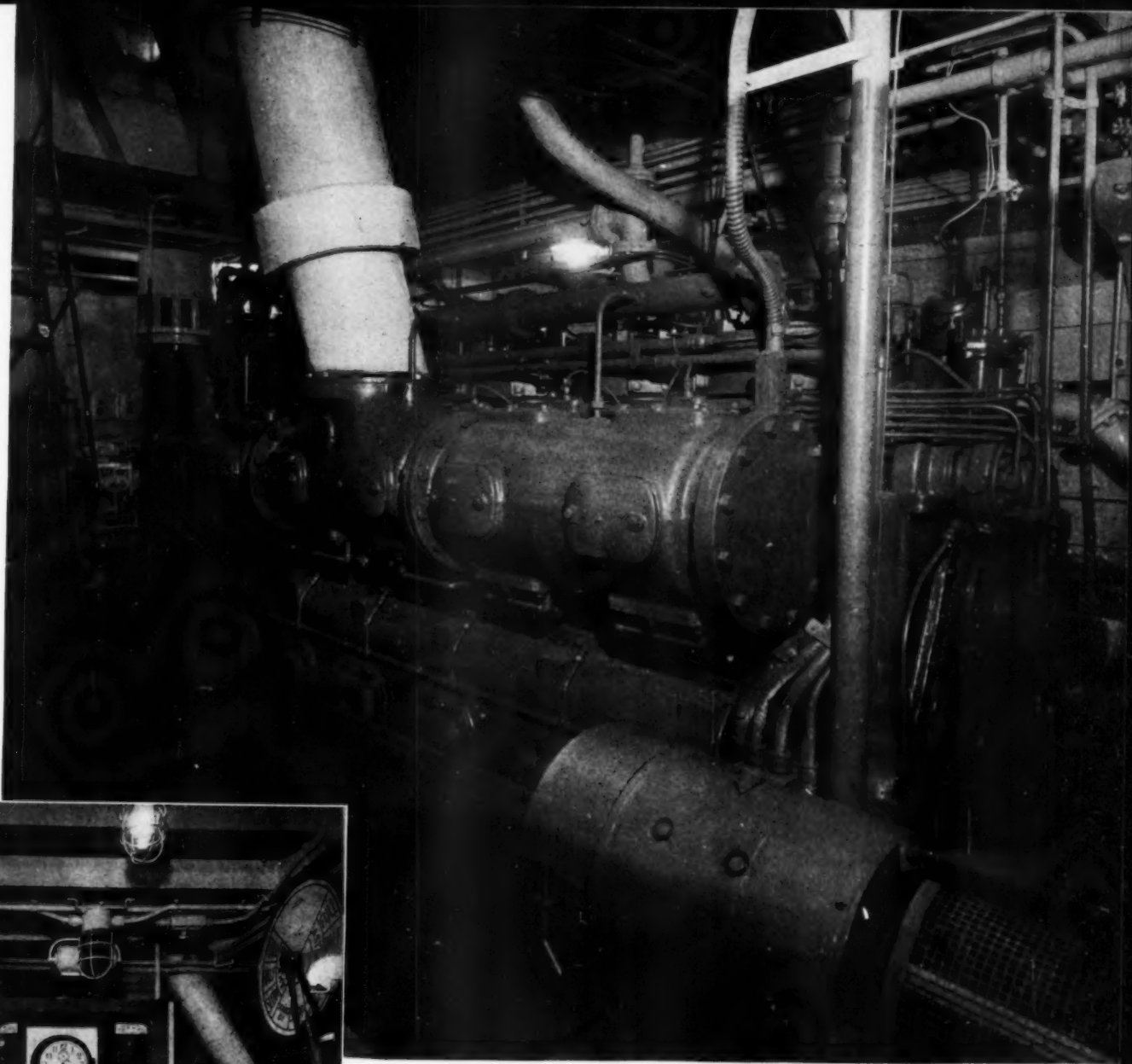
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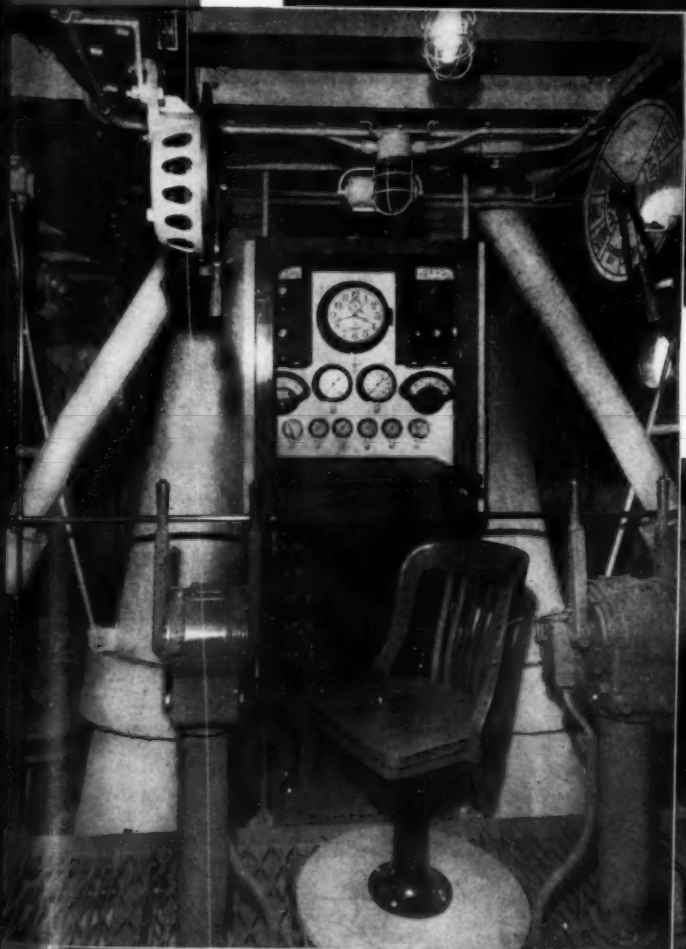
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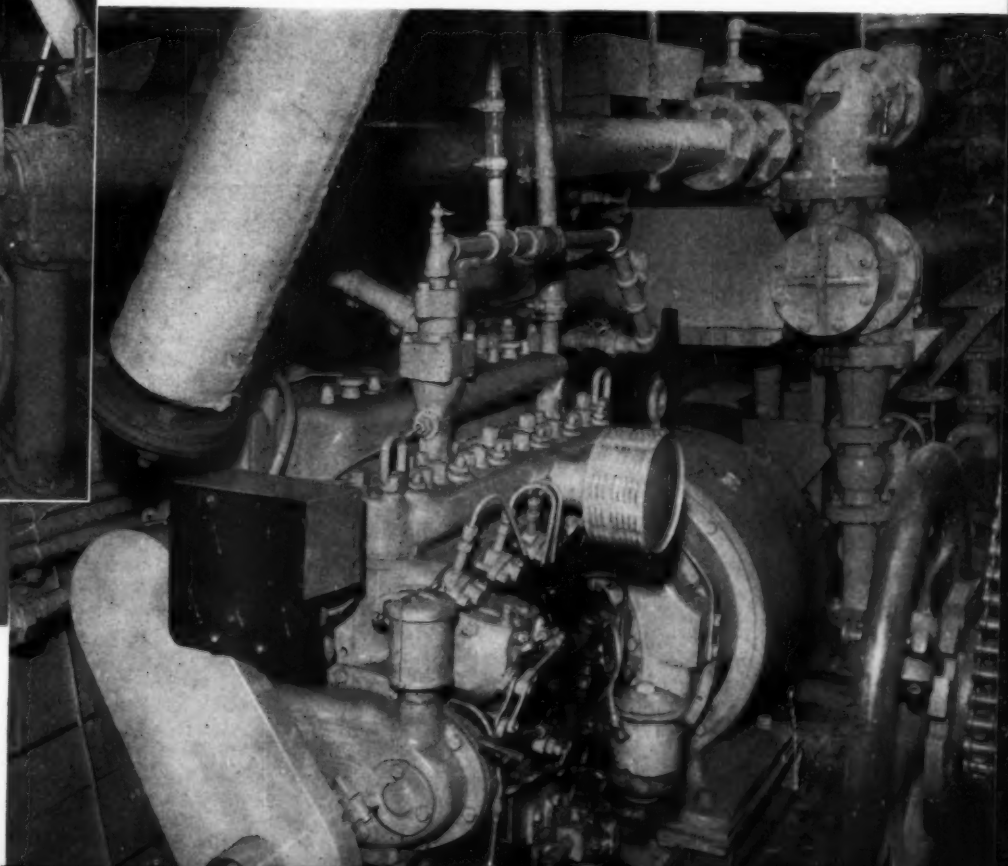


Port main Fairbanks Morse Diesel showing one of two 25 kw. belt driven shaft generators, foreground.

One of two Reiner Auxiliary units, with Hercules, 40 hp. Diesel and 25 kw. generator.



Engineer's station with air, lube and water gauges, motor pyrometers and Weston tachometers for each engine and Fairbanks Morse remote engine controls.





Caterpillar Diesel tractor lining up its train at a Canadian National station in Northern Quebec; destination is the Opemiska copper mine, 136 miles north of this point.

FREIGHTWAYS BY DIESEL SLEDS

By JIM MEDFORD

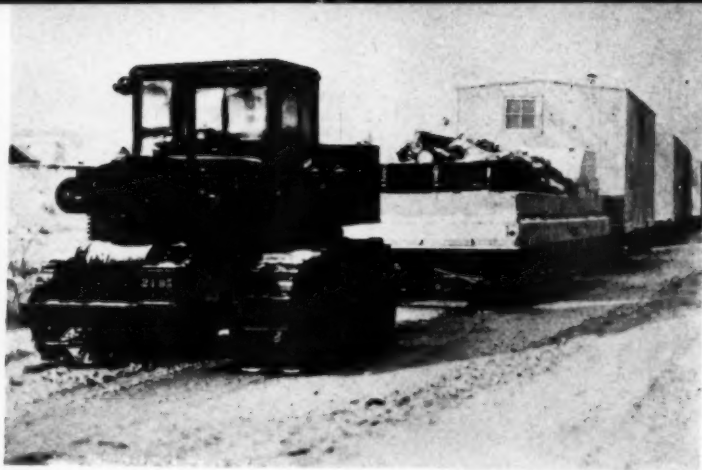
AALEXANDER BOTTS, tractor salesman supreme, is now a captain in the Army Engineer Corps, according to our intelligence officer K-9. And a good thing it is, no doubt. Otherwise, with the showing the Diesel "cat" sleds are making from Fort Norman on the Mackenzie to The Pas in Manitoba and points in Northern Quebec, Alex would be loading up the contract freighters with these track-laying snow locomotives for post-war use.

Pushing north into the Mackenzie, they toted 450 miles of pipe line plus supplies and river transports in 70-below temperatures. From a mile-board stop in Northern Manitoba these Diesel sleds freighted mine equipment for the gold mines toward Hudson's Bay.

At the other extreme of Canada, the Diesels roared their way into the low grade copper ore district where four-dollar ore could be mined and delivered at a profit because they offered low cost transportation between mine and rail-head over the roughest kind of 136 miles between the International boundary and the Arctic Circle.

But the "cats" didn't get that way because of the sales talk Botts has been putting out. Though they had what it took, as Botts said, they had to prove themselves because the Arctic freightways demanded more than the originals footing it along on the thin gruel of a gasoline diet. There was a need for cat "vitamins" and oil at 32 cc's per gulp put hair on pussy's chest.

Down came operating and fuel hauling costs and their tails went up and the tobacco-chewing trail vets nearly swallowed their cuds when 100-hp. Diesel cat walked off with 1,000 lbs. of logs for the La Pas Lumber Company. At temperature so low fuel oil wouldn't flow and was diluted with "coal oil," as the Canucks called kerosene. Loaded on 38 sleds, the swing motor out on the 15-mile haul over "iced" roads making two round trips per working day for a total of 2,000 daily tons and 643,000 board feet. Incidentally, the figurative cat's "tail" developed into a real appendage of plow steel and the skidders rove it through a winch on the best rump. Steep hills then got down on their knees when they heard the bucolic snarl of a Diesel cat echoing through the scrub and burned slash. Arriving at the base of the hills, the "snake" uncoupled the cat, stuck the tip of its tail into the first sled's coupling and up to the summit with the muttering cat, its winch paying out steel as it clawed upward. There, anchored to a



Allis-Chalmers, General Motors Diesel engine tractor on the Canol run to Fort Norman. More than 118 of these tractors were on this run.



Working in snow up to 4½ ft. deep, Diesel tractor-hauled sled trains of the Patricia Transportation Co. Ltd., haul mine supplies 145 miles to Red Lake, Ontario. They work this equipment around the clock, 7 days a week.

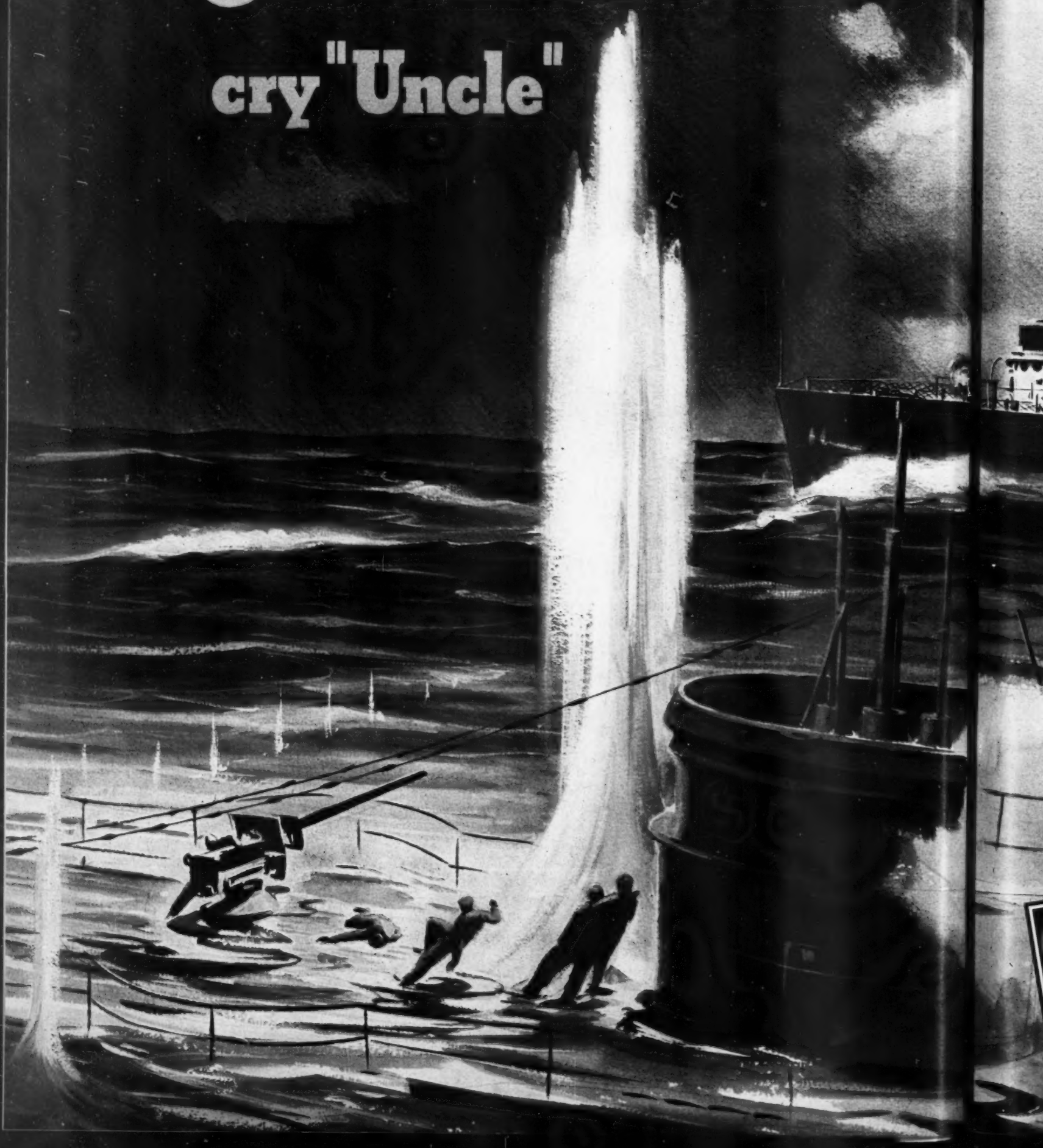
one of its nine lives missing, temporarily.

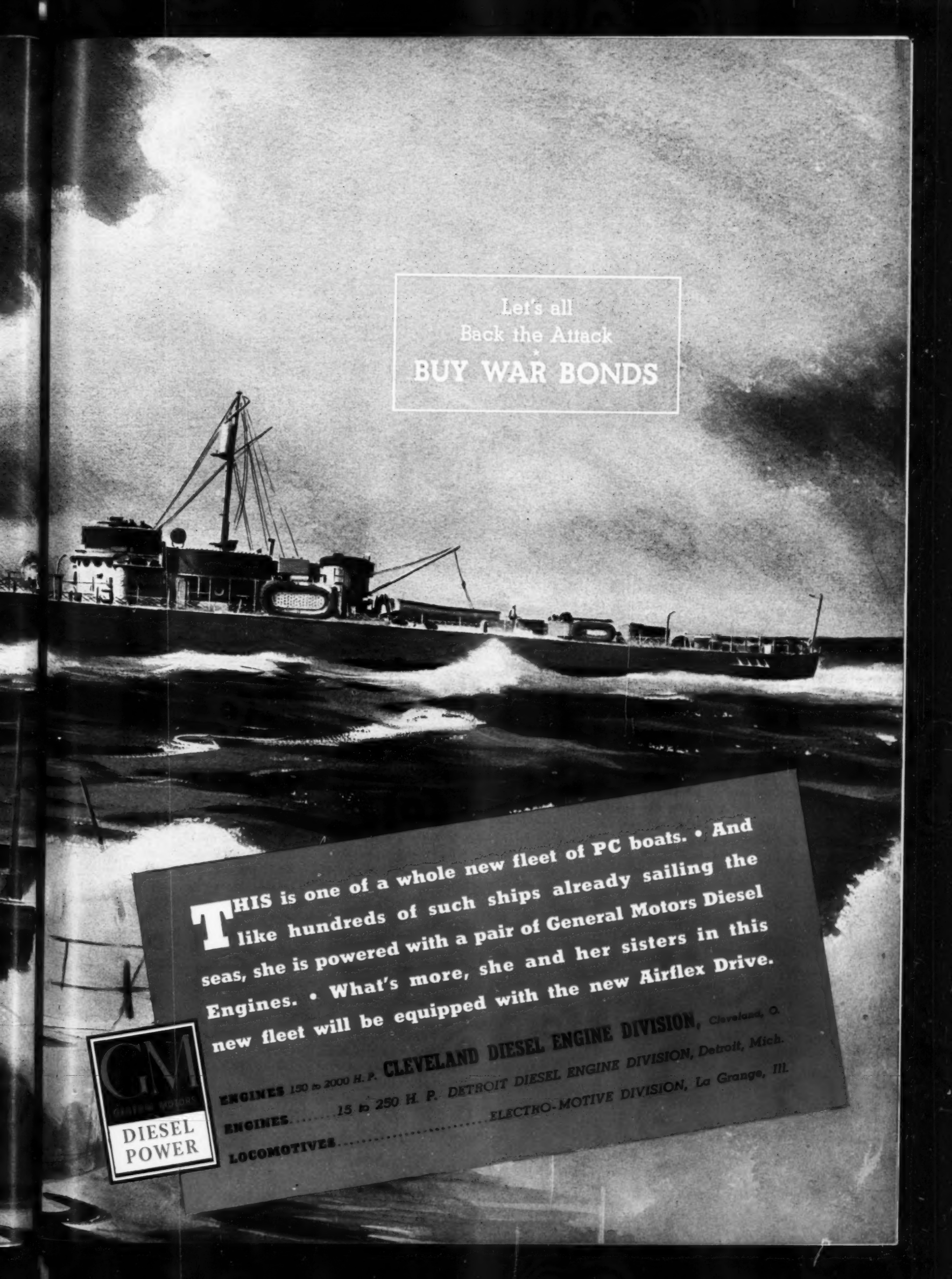
Once, an entire swing loaded with mining machinery went through the ice of the Nelson River. Flown out from Winnipeg by plane, a diver went down and with hot air fed him from pump's intake close to the caboose's stove made a successful salvage. The tractor froze solid in a block of ice on reaching the surface. But by building a canvas screen around it, stripping and cleaning the engine parts, then building a fire of brush under it, back into service it went little the worse for wear except some scorched paint on its belly. Defying both frost and water, it roared off into the empty lands with its sleds and its crew. Dr. Diesel can well be proud of his offspring.

But the most exciting of all was the time the Island Lake Mine shipped out a nice little gold brick worth \$8,000 by a tough old northern skinner. Crossing over the lake and a full half-mile from shore, the ice caved and the skinner with his gold brick in the cab of the cat went into the drink for forty feet.

Struggling out of the cab, the skinner surfaced, blew like a porpoise and was yelling for a shot of "cheer juice" before the shack could yank him onto the ice. Running him back to the crummy, the crew stripped the nearly frozen man, fed him his cheer juice, and tossed him into a bunk with blankets plenty. The "forty rod" no doubt helped to bring him out little the worse for wear but a diver, later flown out from Winnipeg in a ski-equipped plane, went down and came up this time with the multi-thousand gold brick. Then, the cat was yanked up, cleaned and thawed out, to brawl its way into the growing blizzard like a plains calf looking for its lunch before Jack Frost caught up. There's few parts of the Arctic north where the Diesel cats are unknown. Even over the once hell-route of Chilkoot Pass where in '98 along with thousands of others the writer's parents perished, the Diesel cats have taken over. And no more is hay twenty cents a pound for hauling or \$500 a ton east of the Divide. Out of Whitehorse to Rampart it's Diesel all the way, the cats roaring their defiance to the dancing Northern Lights that "rustle" over the Northern Sea. For treasure trove or oil casing to the Arctic Circle; timber and machinery for a Hudson's Bay country mine; a thousand tons of logs or canned peaches and toilet soap for some "Company's" trading post—it's all the same to these snow-bucking transports and their colorful crews of sour-doughs; made possible because of the development of the Diesel engine and the tread named after a fuzzy worm—the "Caterpillar."

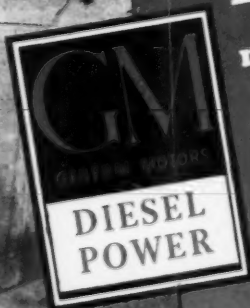
Out to make U-boats cry "Uncle"





Let's all
Back the Attack
BUY WAR BONDS

THIS is one of a whole new fleet of PC boats. • And like hundreds of such ships already sailing the seas, she is powered with a pair of General Motors Diesel Engines. • What's more, she and her sisters in this new fleet will be equipped with the new Airflex Drive.



CLEVELAND DIESEL ENGINE DIVISION, Cleveland, O.
ENGINES 150 to 2000 H. P.
ENGINES 15 to 250 H. P. **DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.**
LOCOMOTIVES **ELECTRO-MOTIVE DIVISION, La Grange, Ill.**



Figure 1—Dynamiter loads oil hole in large Diesel shaft preparatory to blowing. Nels Sorenson, originator of method, watches. This procedure is saving thousands of dollars.

DYNAMITE — A SIMPLE, EFFECTIVE MEANS OF REMOVING BROKEN DRILLS FROM CRANKSHAFTS

THE casual conversation between a golfer hunting a lost ball and a farmer blowing out stumps has resulted in a salvage procedure that is quickly removing broken drills from the oil holes of hundreds of precision made crankshafts and is saving annually many thousands of dollars. The method which employs dynamite can also be used to remove broken reamers or plug gages. It is especially suited for clearing deep drilled holes.

Today, in the plants of The Ohio Crankshaft Company, producer of automotive, aviation and Diesel crankshafts, skillful use of this high explosive has eliminated the scrapping of a shaft because of a broken drill. Unconventional from an engineering standard, it has proved itself highly effective.

Originator of the dynamiting method is Nels

Sorenson, Superintendent of the automotive crankshaft division of the company. Seeking a certain and less costly way to counteract the curse of crankshafts—broken drills in oil holes—the sight of the farmer tamping dynamite into a stump gave Mr. Sorenson an idea. Could the same thing be done to remove drills? Tests in a coal bin proved that it could.

That was ten years ago. Mr. Sorenson has perfected his technique and taught others to do the work so that now by actual count he has lost only two shafts from which the drills could not be blown. Thousands of shafts have been withdrawn from salvage and returned to the production line because of the Sorenson method.

Significant is the lack of costly equipment necessary to accomplish the dynamiting, and the clean cut results following the blowing. Needed



Figure 2—Dynamiter ignites fuse after tamping dynamite into oil hole and inserting cap. Less than a thimbleful of explosive is used. Drill has broken off well down in hole.

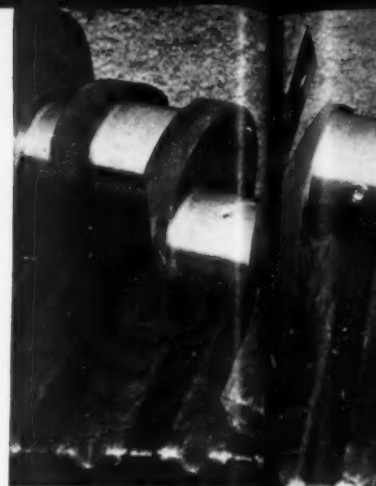


Figure 3—As for 4 in. timber bearing to when it is blown

are only a clearing in which the salvage work can be carried out, common dynamite, fuse, caps, wire probe, putty and a brace and bit. So simple is the procedure that automotive engineers have not believed the dynamiting possible.

At Ohio Crankshaft educational efforts have been put forth to help reduce drill breakage. Some progress has been made but as in all shops drills are broken either because the operator feeds the drill improperly or forces it so that chips cannot back out. The salvage department would be cluttered were it not for the dynamiting that enables a quick return of the shaft to production and the procedure can be applied to any fixture, die or part wherein drills, plug gages or reamers may break.

Experience has shown the monthly breakage of drills varies and the value of the crankshafts saved does likewise. Savings are computed on the style of crankshaft more than on the quantity from which drills have been removed. Recently, 93 shafts were blown free in one month. Their value was more than \$42,000 dollars. In another month some 133 shafts valued at only \$29,000 were treated. In comparison to the value of total production the number of crankshafts salvaged is not large but the savings resulting from this homespun procedure are considerable.

Technical terms cannot describe Mr. Sorenson's dynamiting technique. It is simplicity itself. The shaft in question is removed to a clearing outside the plant and placed on a platform, steel skid or the ground. With a wire rod, the hole is probed to determine position of the drill below the bearing surface.

Dynamite is taken from a standard stick of blasting powder and pushed from a small trough

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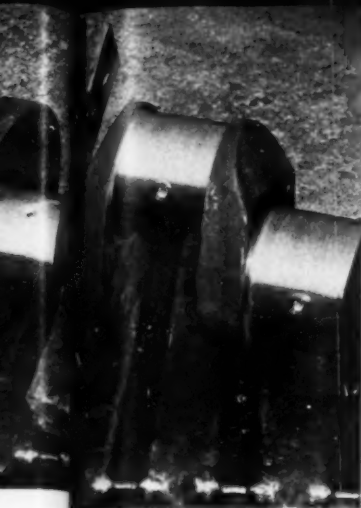


Figure 3—As fuse is lit this 4 in. x 4 in. timber is placed across the bearing to check the drill when it is blown free.



Figure 4—Mr. Sorenson points to broken drill which has split the 4 in. x 4 in. timber and imbedded itself deeply in the wood. Drills have even gone through sheet metal guards.



Figure 5—Collection of broken drills picked up from the ground around the blasting area. The large lumps are sections of a big core drill blown out by means of several shots. Note oil holes in core drill.

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into the hole by means of a round stick. (Fig. 1). No more than a thimbleful is ever used. Generally, the amount is considerably less depending upon the size of the hole and the set of the drill. Practice has shown the proper quantity of powder to use for certain conditions and in teaching his salvage blowers, Mr. Sorenson stresses "put in less powder than too much."

A six-inch fuse is next inserted into a small diameter, shoulder-free cap and dropped into the oil hole atop the charge (Fig. 2). When ignited a heavy plank or metal shield should be placed over the bearing surface to check the flight of the drill member as it is blown free (Fig. 3). Frequently, timbers are split (Fig. 4) or the drill penetrates metal guard sheets. It is wise to keep at a safe distance during the dynamiting.

Drills are freed by the pressure of the blast which follows the drill flutes to the bottom of the hole and there reverses itself to drive the piece back out. As it leaves the shaft, the drill makes a ringing noise of metal striking metal.

Wonder has been expressed relative to the effect of the explosion upon the metal. There is no evidence of harm for thousands of crankshafts subjected to this operation have turned in long service records. The dynamiting of the drill from a crankshaft or other steel object can be compared to the explosion of a cartridge in a gun barrel. No harm befalls the gun block. The same is true in appraising the blowing of the drills. The charge has no effect upon the high quality steel of the crank or camshaft.

Immediately upon "blasting" the piece is closely inspected, magnafluxed and returned to the line. Many times a broken drill has been reported, removed by dynamiting and the shaft

put back into the line with no more than forty-five minutes delay.

Drills removed (Fig. 5) vary in size from small 3/16 in. bits up to 1 1/4 in. core drills used in making lightening holes in camshafts. These big drills must be removed piece by piece requiring more than one shot. The dynamite is tamped into the oil hole of the drill itself. Frequently, if a drill operator has himself endeavored to remove the drill, he forces the piece even tighter into the hole thus necessitating more than one shot. In fact, Sorenson once blew 72 charges before a big drill in a large Diesel shaft came free. The value of the shaft was such that no amount of effort to free the oil hole was felt excessive. Once a drill breaks off, drill operators are instructed not to attempt its removal.

To test results of dynamiting, the "blower" uses a common brace and bit. When the bit is inserted in the hole it reveals by difficulty in turning or by a clicking noise that the drill is still within. If it turns easily and backs out chips, the drill has been blown free.

Occasionally a drill breaks off flush with the bearing surface. To blow this necessitates building a putty dam of 1 1/2 in. in height above the hole. Into the dam is inserted a fuse and dynamite cap (Fig. 6) which on detonating either blows out the drill or enough of it so that the next charge can be inserted directly into the oil hole thus finishing the job (Fig. 7).

Unconventional as is this explosive method it has proved sound and has recently been adopted by other automotive manufacturers not only in this country but in England. It is saving untold hours of labor, tons of strategic metal and thousands of dollars. Uncle Sam thinks this idea O.K. also.

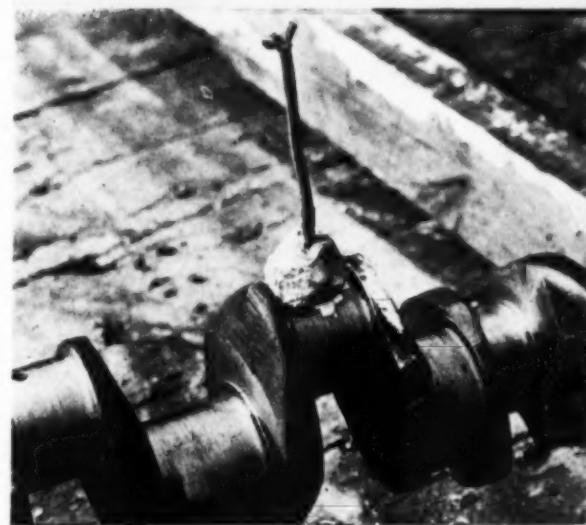


Figure 6—Putty dam built up around an oil hole in which drill has broken off flush with bearing surface. The cap and fuse are ready for ignition.

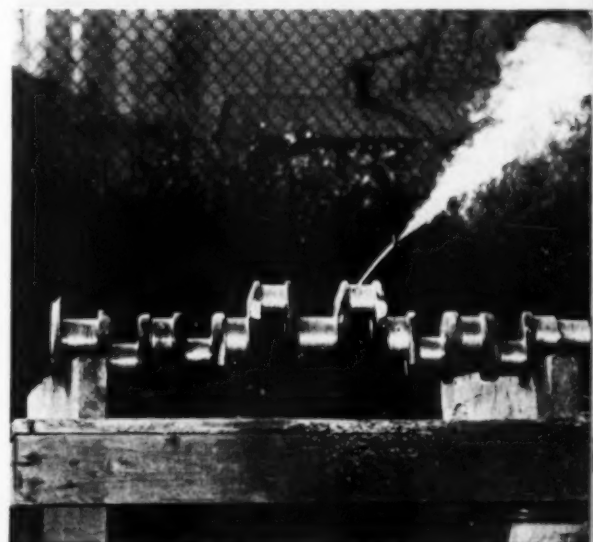


Figure 7—Second shot on shaft in Figure 6. First explosion blew enough of drill from hole to allow second charge and cap to be inserted directly in oil hole. Fuse is burning.

SUPERVISING & OPERATING ENGINEERS' SECTION

"DIESELS AND MAJOR OPERATIONS"

Conducted by R. L. GREGORY*

IN the operation of any Power Plant, irrespective of the type of generating equipment and prime movers involved, and irrespective of a well organized program of maintenance and periodical inspection, the time eventually arrives, when your equipment is in need of what we know as a "Major operation or overhauling." This is particularly true of Diesel engines.

A "Major Overhaul" as the term is used here, differs from the semi-annual or annual overhauling and inspection to which most of our units are subjected, in that such an overhaul requires a longer period of outage, a much more thorough inspection, and in ninety-nine cases out of a hundred, a considerable outlay in money for major parts and the labor involved in making the replacements.

When such a "Major Overhaul" is necessary under normal operating conditions is determined by just one factor. That factor being, when you arrive at the place where maintenance costs and the attendant outage for maintenance becomes excessive in order to maintain the efficient operation of the unit. This period varies with different types of Diesels and different operating conditions, and is on the whole primarily determined by local plant conditions, no hard or fast rule can be set to determine just when this period will arrive.

As an example let's take the case of your automobile, an example which all of us have experienced at some time or another. You purchase a new car and drive it month after month, through all sorts of weather, over all sorts of

roads and under all sorts of conditions. Periodically you take it to your favorite garage and have it checked up. But with all this care and coddling sooner or later you begin to experience small troubles which are overcome at first by more frequent calls to the garage mechanic. You do not get the mileage on your gas rations which you did, the car requires frequent amounts of lubricant, the ignition system balks now and then, until finally someday you are left stranded on some highway with a burnt out rod, out of gas, or faulty ignition due to wear and tear on the car. And right then and there you decide that it is time to either have a major operation performed on that car, or if it happened in normal times, that it is time to get rid of the headaches by purchasing a new car.

Well the same conditions confront you with your Diesel operation. The plant runs along month after month, or year after year with the occasional inspection and maintenance problems taken care of. But each month additional wear is taking place to the various moving parts, both major and minor. Then you discover that the efficiency is dropping, you are not getting the accustomed kwh per gallon of fuel and lubricant and you start to investigate. You find that the liners are beginning to wear, you have more frequent blowby and consequently more frequent changing of rings, inspection of fuel apparatus, you note peculiar knocks and sounds emanating from the unit and you begin to wonder whether the bearings are wearing excessively. You note more sludge and carbon residue and you try first one remedy and then another and spend more time on your unit, taking every outage opportunity to correct first one thing and then another, but to no avail, the efficiency

continues to drop and you continue to become more irritable. When that time arrives, you have reached a point where the only sure cure, is a "Major Operation."

Therefore you lay your plans accordingly, revise your operating schedule in order that the unit in question may have the required outage period, assemble your equipment and get the "Operation" under way.

Now just what does such an operation entail. Well it should include a thorough inspection of the entire unit from one end to the other. Such an inspection and repair program may uncover a lot of things, which perhaps you or the manufacturer of your units are not aware of, since many of the major parts are not available to inspection only when the unit can be spared for outage long enough to get into the vital parts.

It may entail the renewal of the cylinder liners, which in itself is a sizable and costly job, from the standpoint of material costs. It entails a thorough inspection of the cooling system and all the heat exchangers. A checkup on all fuel apparatus, pumps, fuel nozzles, piping, pumps, tanks, etc. All bearings, crossheads, crank pins, crosshead slides, connecting rods, etc., should be checked for wear.

The pistons and piston heads should be checked, rings inspected, sludge rings and wiper assemblies cleaned and worn parts renewed. If you are operating an air injection engine, the scavenging system compressor valves should all be gone over and worn parts renewed. Cam And now please turn to page 70

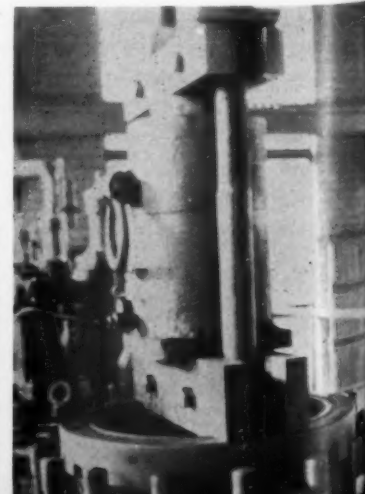
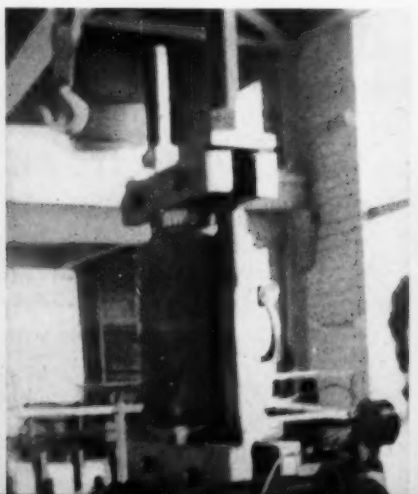
* Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.

Fig. 1

Fig. 2

Fig. 3

Fig. 4



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FOR DIESELS

AUTO-LITE has applied to the development of electrical systems for Diesels the knowledge and experience gained through thirty-two years of building automotive electrical equipment. The dependability of these units is responsible in large measure for Auto-Lite's leadership as the world's largest independent manufacturer of automotive equipment.

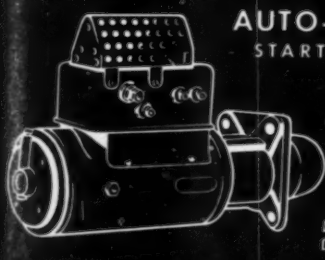
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plete from generator to voltage control to battery to starter. These units are part of a long list of items Auto-Lite's 26 great manufacturing divisions are producing for America's Armed Forces on land, sea and in the air. Diesel manufacturers are invited to consult us on problems involving electrical cranking or generating equipment.

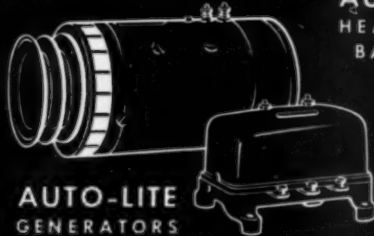
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Exchange Your Diesel Maintenance Ideas

Conducted by R. L. GREGORY

Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department—mail your contributions direct to DIESEL PROGRESS.

"Welding of Cracked Cylinder Heads"

THIS department is in receipt of a letter from Mr. Carl Guth of the Guth Welding Works, in reference to a recent article on the above subject of cracked cylinder heads. Since it is of interest we quote it here in part:

"We too have noticed an increased amount of cracked Diesel cylinder heads in the past few years and no doubt the causes are correct as outlined in Mr. Gregory's article in the December 1943 issue of DIESEL PROGRESS.

"In my opinion heads crack, due to the growth of the iron itself, because iron does grow when subjected to heat and of course the zone around the valves and spray nozzles does get the most heat and very often the least cooling.

"Heads often crack on the outside, where there is a minimum of heat, and still do not crack internally. The cause for this appears to be that the inner surfaces were stronger, pushing the outer surfaces apart, rather than upsetting the inner surfaces.

"In past years we have reclaimed a good many large Diesel heads, and cylinders to say nothing of the hundreds of smaller Diesel parts, with a high degree of success. There are in practice many methods of repairing these castings, but in my observation, I have not seen anything equal to a properly fusion-welded job.

"This does not mean ordinary preheating and welding methods will accomplish a successful job. I feel sure that much could be done in this field to improve fusion welding of cast iron, namely weld metal and fluxes.

"Mr. C. W. Brett of the Marine institute of London, England, has a very good article on this subject in the last March issue of British Motorship."

Mr. Guth attached a folio of some of his work

with the above letter and from photos included of work before and after repairs it is very evident that he has made a study of this particular line of repairs. Since there seems to be a great variance of opinion as to the feasibility of welded cracked cylinder heads, especially on larger units, this department hopes to be able to present in an early issue, some of the obstacles which Mr. Guth has encountered and overcome in accomplishing successful welding of large Diesel heads.

Of course we are all aware that all cracked cylinder heads and cylinders are not due to uneven expansion or growth of the iron. A cylinder head can be very easily damaged or cracked by other causes such as uneven pulling down of the heads, too much strain on the head bolts, faulty cooling systems, excessive blast pressure. But regardless of the causes of the cracks, if a feasible method of welding them successfully so as to give longer life to these heads and assure continued operation is obtained, a great saving would be realized by many Diesel owners.

The writer obtained a copy of the March issue of "Motorship" referred to in Mr. Guth's letter, and the article written by Mr. Brett of the Marine Institute of London, England is most interesting and well worth reading as it contains some interesting points on the subject.

"Keeping the Cooling System Clean"

This department has received several letters from various plans lately discussing their problems of rust and oxidation in the cooling system. Keeping the cooling system of a unit clean, is one of the maintenance jobs which should have prompt attention.

Two factors generally determine the condition of the cooling system, assuming that the piping is large enough to pass a sufficient amount of cooling agent through it under all load conditions. These two factors are the nature of the cooling agent, and the nature of the system itself whether the open system, with cooling tower, or the closed system, using the heat exchanger method.

The supply of cooling agent if taken from a lake or deep well pumps will in most cases have a hardness content, which when once predetermined can be treated with chemicals so as to

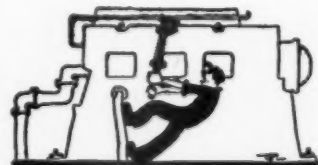
give a minimum of oxidization in the system, especially where little makeup water is used, such as in a closed system of circulation with the conventional surge or expansion tank.

In the open system where water is passed through a cooling tower, considerable oxygen may be picked up by aeration, and in that case it may require considerable study and varying of treatment to the water. If on the other hand the open hot well is used and the discharge from the unit back into the well is kept below the water level in the well, there is not as much danger of oxidization as there will be where the water discharge is above the water level of the well so that the discharge cooling water has to fall through the air to again enter the hot well. This has been proven in several instances.

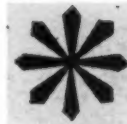
On the other hand, where the cooling agent is taken from rivers and sources of other types, where the water conditions change from time to time, closer tab must be kept on the cooling water itself. This is particularly true where rivers carry a lot of debris and sediment, or where large amounts of impurities are allowed to drain into the river. For example the writer recalls one instance in which a Diesel plant was located just below a large industrial plant, which used considerable amounts of acid in their manufacturing process.

These wastes were allowed to pass out through a 24" sewer into the river, and eventually some of these impurities were picked up in the cooling system of the Diesel plant, causing trouble. Several methods were used to correct this trouble, but the one which finally ended the trouble was the changing of the source of cooling water, by drilling a deep well. This of course was an extreme case, but illustrates the point of what impurities in the water supply might do to your cooling system.

A good policy to follow is to test the cooling water occasionally for grains of hardness, and treat it upon the basis of the test. If this is properly done, you will find a minimum of rust and scale formations.



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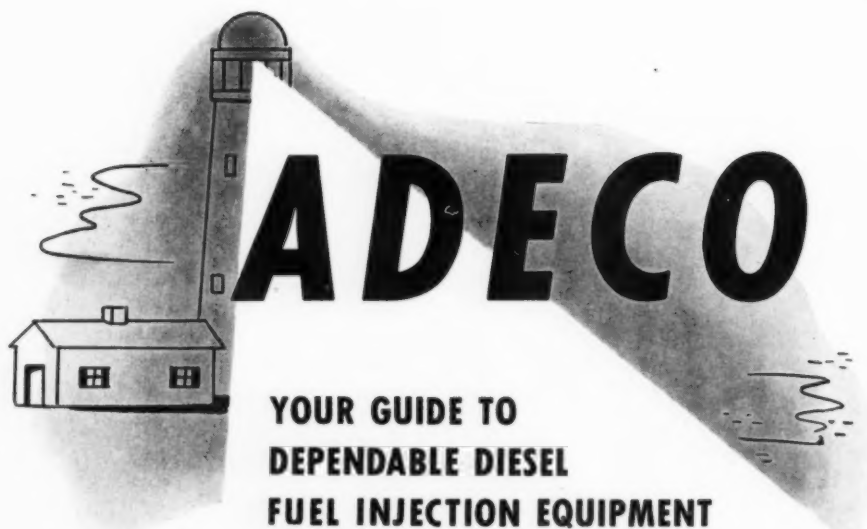
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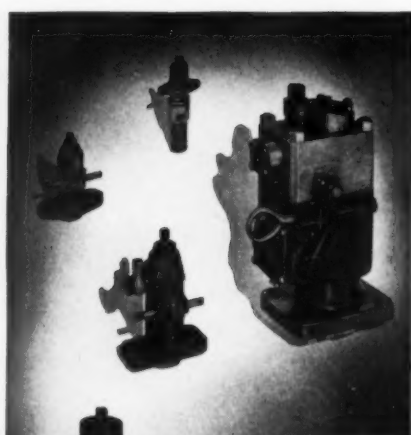


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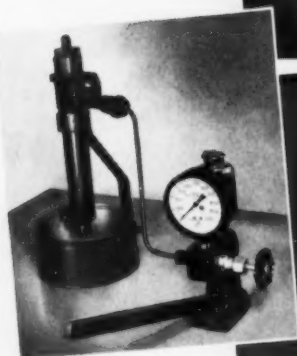
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John Dickson Peers—

Continued from page 41
crease of speed as a sole factor for this same size of engine."

Touching on the familiar subject of the resistance to today's faster speed engines by those whose previous knowledge of Diesels is confined to the old slow speed heavy engines, Mr. Dickson pointed to the greater reliability records of the faster speed engines in gruelling war experience and then cited the fact that the term "high speed" in connection with such engines is only relative. It is purely a question of design. Actually, he said, the fastest run Diesels of today have only about half the shaft speed of the ordinary gasoline automobile engine and are not by any means up to the speeds which we can expect in Diesels in a few years.

The speaker admitted that with only the knowledge of a few years ago available the bearing surface speed of 80 feet per second which occurs on one Diesel engine today would have appeared impossible. However, that was before engine users knew that "the higher the speed a shaft operates in a bearing, the better able the bearing is to sustain high loads without detriment to itself. So, in post war power, I feel people will lose the inherent fear that the term 'high speed' appears to arouse."

Mr. Dickson disclosed that during experimental work in the General Motors Diesel Laboratory to determine what might be done if Diesel operated war vehicles were caught somewhere without standard Diesel fuel oil available, it has been determined that gasoline, when injected under very high pressure, burns later in the Diesel cylinder than fuel oil.

"We know that the gasoline engine has a compression ratio of say 5 to 6 to 1, whereas the Diesel engine has a ratio of 16 to 1, and that as we advance beyond 6 to 1 in the gasoline engine, anti-knock properties have been added to the gasoline to permit operation at high compression ratios. However, it has been found possible to inject gasoline in exactly the same manner as Diesel fuel is injected in the Diesel engine; that is, into a 16 to 1 compression ratio, and obtain a normal operating engine both as regards sound and performance.

"As a matter of fact, when the gasoline is injected into the hot air of the combustion space ignition of the gasoline takes place slower than when Diesel fuel is injected. This is contrary to what many might have expected. Knowing gasoline to be such a volatile fuel, they visualized that the injection of gasoline into 16 to 1 compression ratio would blow the heads off. but



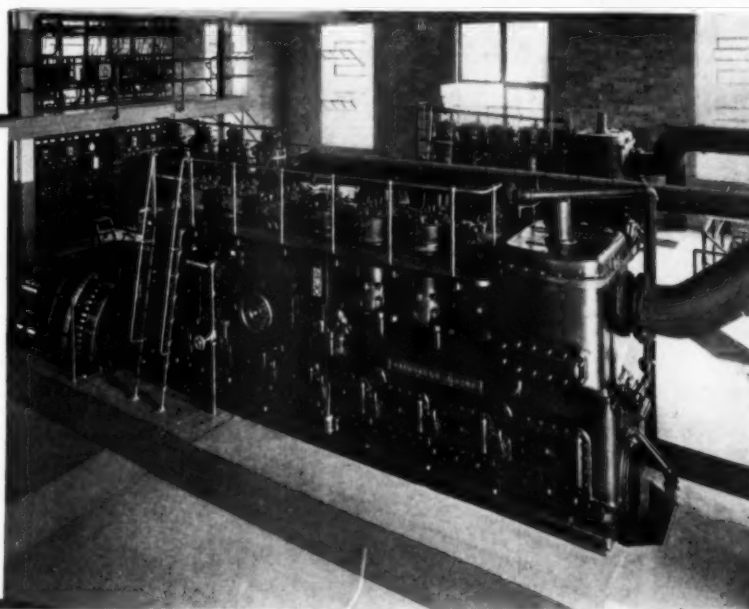
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this is not so. Ordnance vehicles have been constructed and operated with two tanks, one containing gasoline and the other one Diesel fuel so that by turning a valve in the operator's compartment the Diesel engine would operate upon either gasoline or Diesel fuel."

Mr. Dickson said that the records of these experiments showed that whereas the same gasoline burned in a gasoline engine would give ten miles per gallon it would give 14 miles in the experimental vehicles in the Diesel engine, as compared with 16 miles to the gallon obtained by the use of regular Diesel fuel.

"Some of you," he added, "may feel you would like to have me tell you when we will have Diesel engines in our automobiles. Well, that answer I cannot give. However, here is a development which would have immense practical value if and when there is a transitory period from the gasoline operated automobile to the Diesel operated automobile. Now do not misquote me. Note I said, 'if and when,' because there are many major factors to be overcome in its accomplishment. However, imagine yourself confronted with the prospects of buying a Diesel engine operated automobile. One of the first questions that would come to your mind would be: 'How would I be able to drive up to a gas station and obtain Diesel fuel?' Well, the automobile salesman, when that day comes, will be able to advise you that if you cannot get Diesel fuel, then just put gasoline in the tank and you will obtain greater mileage per gallon than if you had purchased an automobile with the normal gasoline carburetor engine. Of course, you can realize that there are more BTU's per gallon of Diesel fuel than in a gallon of gasoline, therefore the Diesel fuel would be what you would prefer.

"Another point that would be of interest in the filling of your tank would be that you would find that the lower the octane content of the gasoline, the better would your automobile Diesel engine like it."

Enterprise Opens Eastern District Office in New York

SIMULTANEOUS announcement of two important developments of the Enterprise Engine & Foundry Company indicating the expanding scope of the concern's activity is made by Mr. C. G. Cox, vice president and general manager. Mr. Cox announces the appointment of Mr. E. H. Davis as manager of the Eastern District office recently opened at 44 Wall Street, New York City.

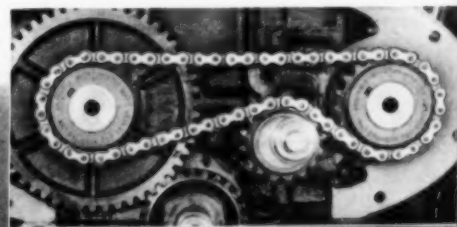
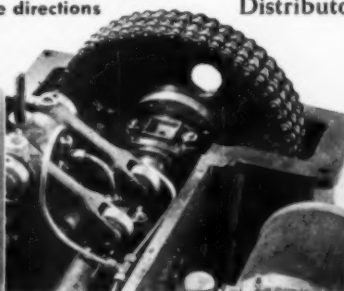
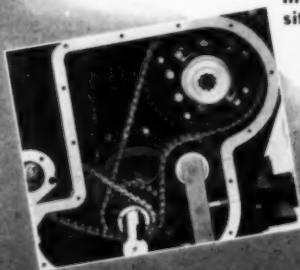
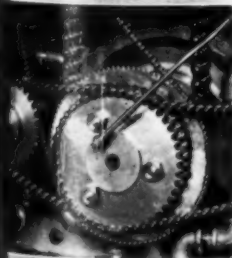
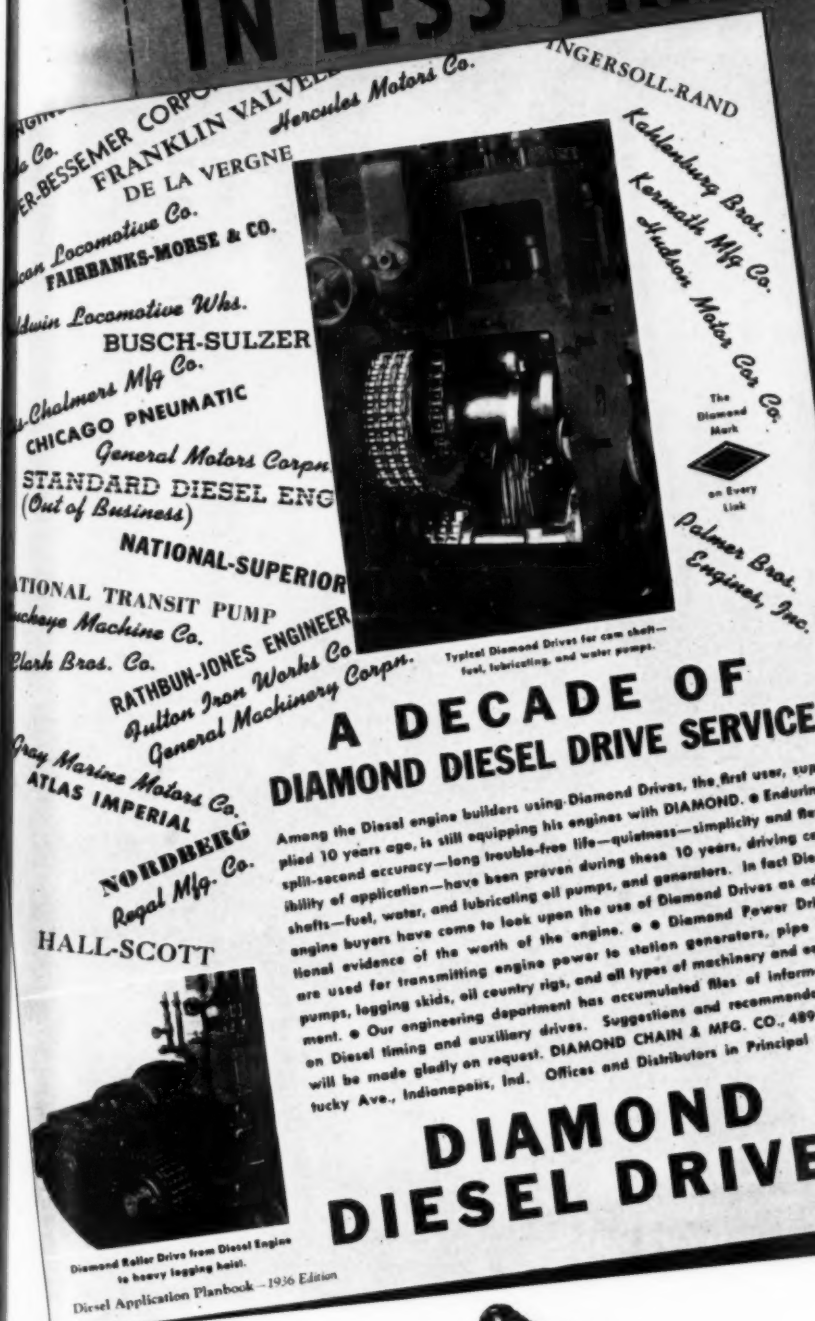
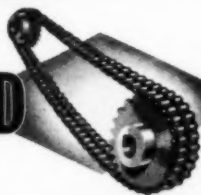
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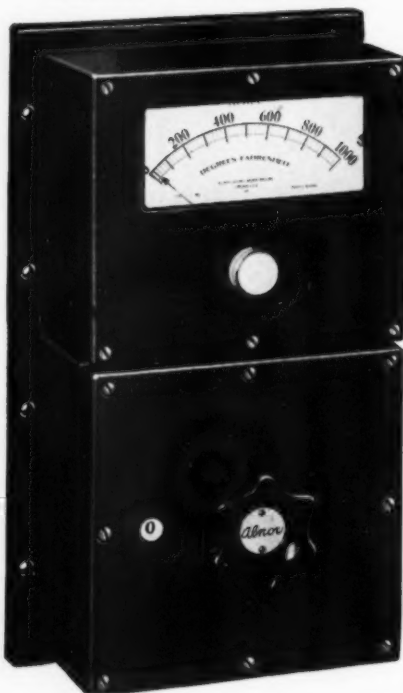
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Type RT switchboard type, capacity up to 28 circuits. Also built for flush mounting.



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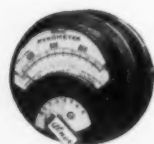
Type BZ, 8 or 17 circuits



Type RK, 2 circuits



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Alnor Exhaust Pyrometers offer a dependable guide to efficient operation, proper adjustment and maintenance of Diesel engines. Big and little, afloat or ashore, thousands of engines are operating with the protection of a constant watch on exhaust temperatures available with dependable Alnor Pyrometers. The routine check of operating temperatures is so easy with Alnor Pyrometers and so important to continued efficient operation, that leading engine builders install Alnor instruments as standard equipment, and operators everywhere rely upon them.

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The staff of the Enterprise Eastern office, from left to right: Robert Stickel, chief erecting engineer; Miss H. McPartland, secretary; Mr. Davis, district manager; Harry Huxford, service department; George Johnson, field engineer.

"Both the appointment of Mr. Davis and the opening of an office in New York are logical steps on our part," Mr. Cox states, "as this will be our headquarters for governmental and commercial activities on the Atlantic seaboard."

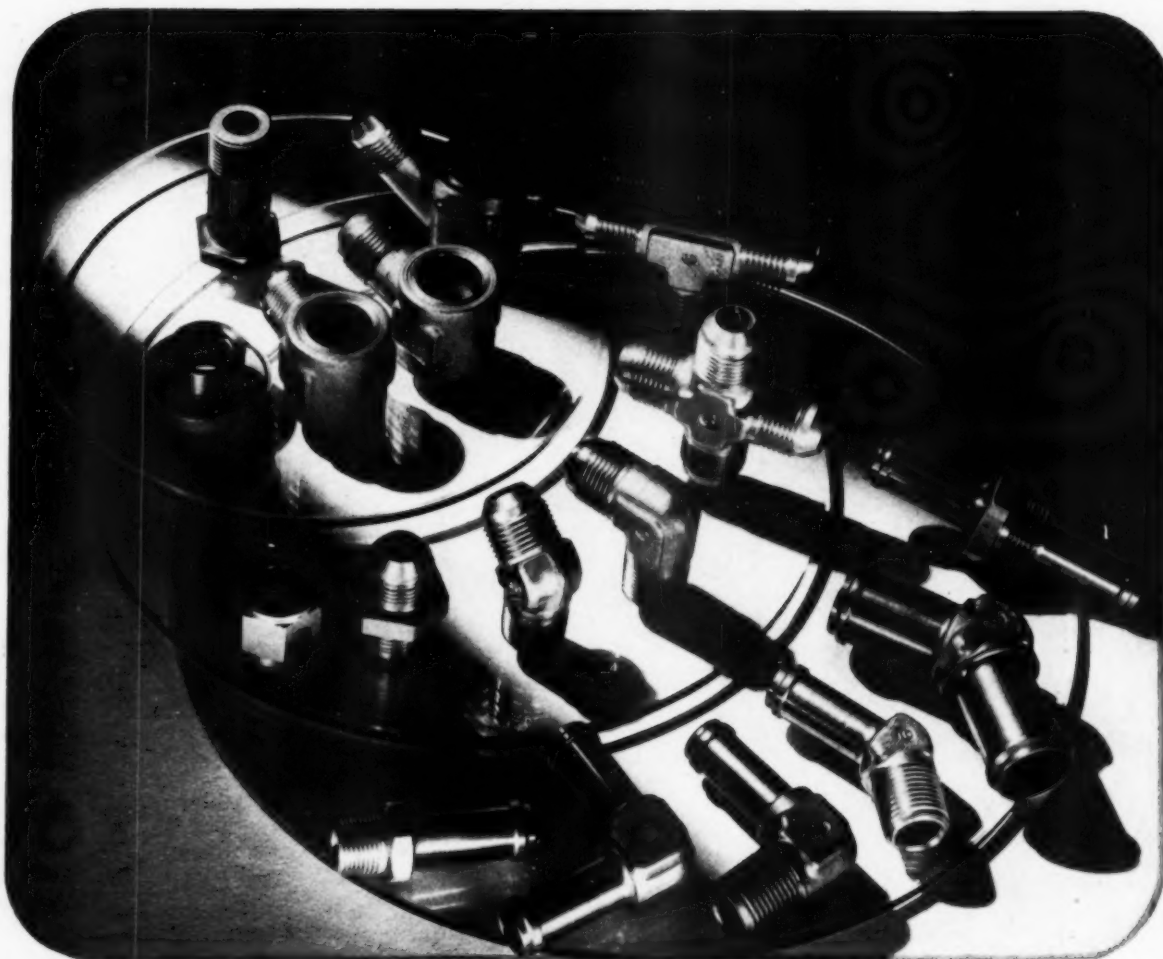
Mr. Davis is well known in the Diesel engine field and has been prominently identified with many of the developments which have brought Diesels into greater use in all spheres of power development. He is recognized as an alert leader of the industry.

The Enterprise Engine & Foundry Company, started in California 57 years ago, has three major divisions which produce, respectively, heavy duty marine and stationary Diesel engines; process machinery; oil and gas burners. When the nation started to re-arm, the Enterprise company assumed its role in war production with the products of the plants going directly to the Army, Navy, U. S. Maritime Commission and other governmental war projects.

During the war a steadily increasing number of installations have been made by Enterprise on the East Coast and the immediate concern of the Eastern District Office staff under the direction of Mr. Davis will be to service company products now in war use and supervise installation of further equipment ordered by the government until victory is attained.

At the same time, the New York office will be a permanent addition to the company that will function in the postwar era. Enterprise, Mr. Cox explains, will definitely expand still further when its long term of honorable service to the war effort ends.

"Backed with the experience of more than a half-century," Mr. Cox states, "before the war we were expanding as rapidly as consistent with a sound foundation. In fact, the steady pre-war



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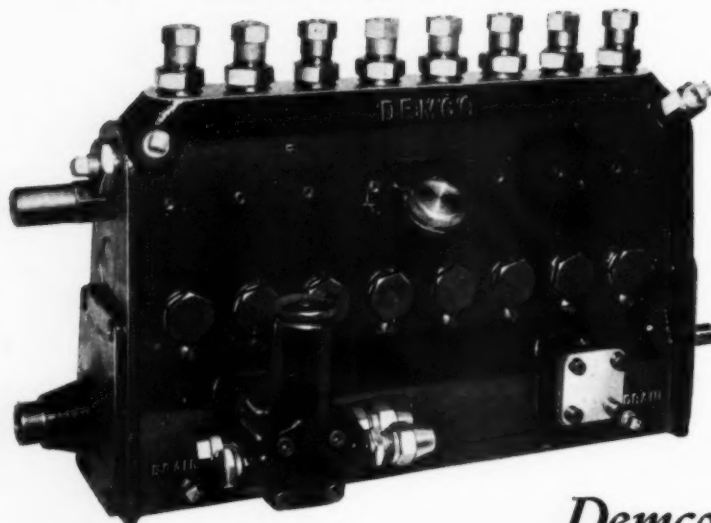
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expansion of Enterprise was a definite factor in our ability to maintain a heavy wartime production schedule. The war has not accelerated our expansion to any great extent beyond what our peacetime strides would have necessitated."

Mr. Davis will be assisted by a thoroughly experienced, competent Engineering Staff composed of Robert Stickel, George Johnson, and Harry Huxford, all well known in Diesel engine circles.

Nordberg Covers the Water Fronts With Diesel Service Engineers

NORDBERG Manufacturing Co. has announced recent appointments of installation and service engineers to cover Nordberg Diesel installations on the Atlantic, Pacific and Gulf coasts, as well as along the Great Lakes, in addition to regular factory representatives.

Ben A. Wilson will take care of Diesel work on the East Coast, working from the Company's New York office at 60 East 42nd Street; George H. Lienhard, Beaumont Hotel, Beaumont, Texas, will cover the Gulf Coast; Ernest L. Church, covers the West Coast with headquarters at 55 New Montgomery Street, San Francisco, and John Kuehn will cover the Great Lakes area, working from the Home office.

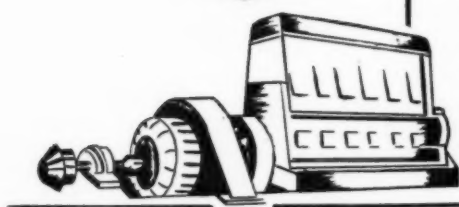
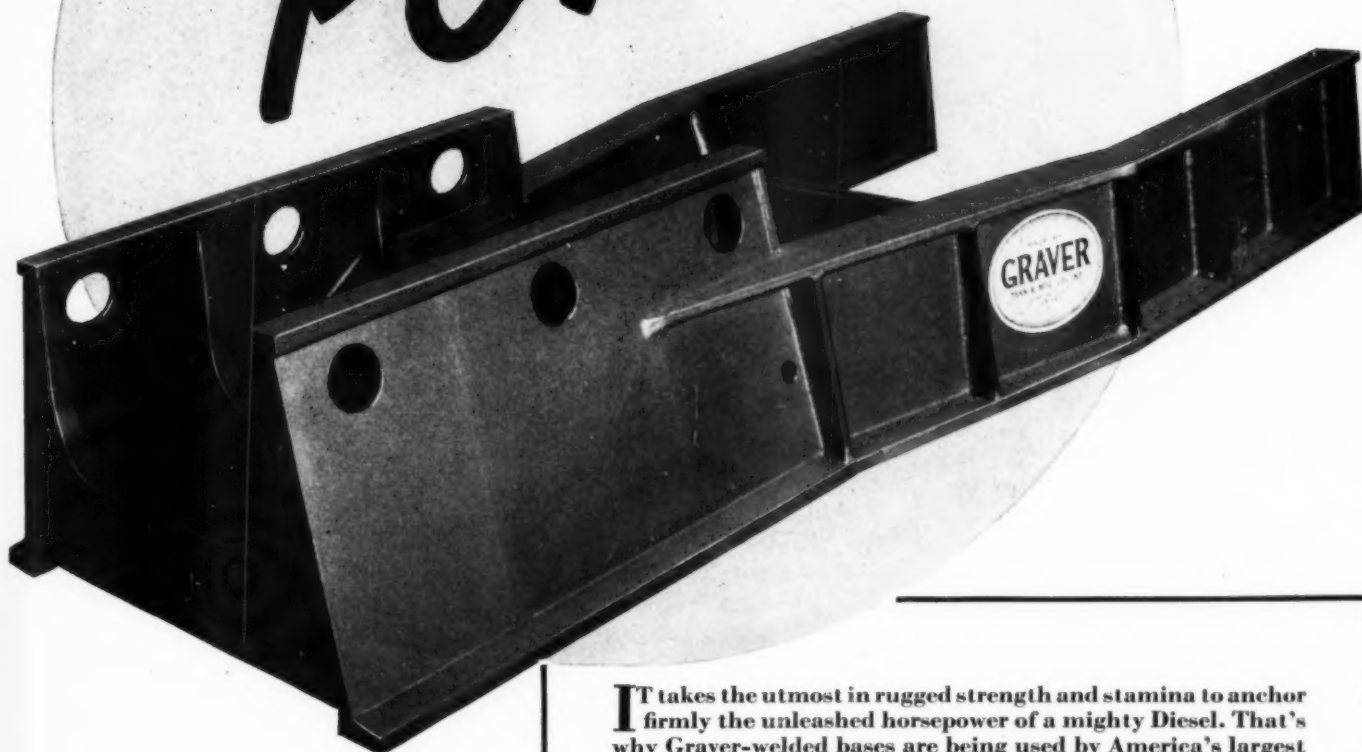
Arnoldy To Head Boots New Chicago Office



William F. Arnoldy

THE Boots Aircraft Nut Corporation recently announced that William F. Arnoldy, head of the firm's Detroit office, will also be in charge of its new Chicago office to be opened in the LaSalle-Wacker Building, 221 North LaSalle Street, on January 10. Mr. Arnoldy will make his headquarters in Chicago.

Foundation for **POWER**



GRAVER

WELDMENTS

It takes the utmost in rugged strength and stamina to anchor firmly the unleashed horsepower of a mighty Diesel. That's why Graver-welded bases are being used by America's largest builders of Diesel engines. Shown above is one of a recent order for 210 of these engine and generator bases. Each measures 143½ inches long, 66½ inches wide, 28½ inches high, and weighs approximately 3,000 pounds. Fabricated from heavy steel plate to meet exacting specifications, welded into a single unit of exceptional strength, stress-relieved to eliminate any creeping or warping after machining, these bases can be depended upon for years of service under the most trying conditions.

This is just one example out of hundreds . . . one illustration of Graver's ability to handle the most simple or the most complex weldments . . . and hit specifications squarely "on the head" every time.

If it calls for welded construction, consult Graver. We'll gladly submit estimates without obligation.

Weldry Division of

GRAVER TANK & MFG. CO., INC.

4811-67 Tod Ave., East Chicago, Ind.

NEW YORK • CATASAUQUA, PA. • CHICAGO • TULSA



Backed by a Quarter Century of Precision Production

Twenty-five years of designing, producing, inspecting machines and parts that require far more than ordinary accuracy—that is the background of Ex-Cell-O Diesel Fuel Injection Equipment. Included in this quarter century are seventeen years of research, development, and actual production in the Diesel field.

Ex-Cell-O Diesel Fuel Pumps and Nozzles — produced as standard equipment for Diesel engine builders—have proven in their efficiency and dependability the importance of this "background of precision." For complete description of Ex-Cell-O Diesel Fuel Injection Equipment, write to Diesel Division, Ex-Cell-O Corporation, 1200 Oakman Boulevard, Detroit 6, Michigan.



Supervising Section

Continued from page 56
shafts, governors and controls should be thoroughly checked and above all do not overlook the starting equipment.

Unit alignment should be checked, because after months of continual operation there is possibility that due to either wear on the bearings, or in some instances settling of the foundation which has been known to occur may cause a difference from the original alignment. This is generally done by means of a strain gauge placed between the various webs in the bearing positions, top center, bottom center, 90 degrees to the front and 90 degrees to the back. If discrepancies are discovered they should be corrected, as letting them go may cause trouble later on.

The electrical equipment should be checked, cleaned and put in first class operating condition. Also in dismantling the unit particular attention should be given to the lubrication of the various parts to ascertain whether any lubrication lines are clogged, whether check valves are functioning and above all whether you are maintaining the proper lubricity on all moving parts. A failure of just one part of the lubrication system may result in frozen rings, a stuck piston to say nothing of excessive wear on liners and rings as well as bearings.

The accompanying cuts show some of the things done in a Major Overhaul of this nature. The liner shown in Fig. 1 was one which was removed due to excessive wear only. This wear had caused frequent changing of rings, low efficiency due to blowby. One thing I wish to call your attention to is the lack of scale on the outer or cooling surface, and investigation showed that the cooling system was quite free from any scale deposits, and the cooling effect was in no way impaired by what little scale had formed in fittings and lines both to and from the cooling jackets.

Figure No. 2 shows the liner pulling equipment set up to remove the old liner, while Fig. No. 3 shows new liners set on the operating flange preparatory to installation. Figure No. 4 shows the liner pulling rig in the reversed position for installing a new liner.

Another point of inspection that should not be overlooked is the inspection of all parting bolts and studs. Each one should be checked to ascertain that the nuts are tight, that pall nuts and cotter pins are secure and that there is no deformation or looseness in these bolted connections.

These are just the high points of a major overhaul.



Tank men can't keep cool—but their oil must!

Yankee engineering skill licks another tough problem

Outside it's 120°. Inside—well, how hot is a blast furnace? Your helmet is lead. The sweat streams down your back.

You're taking real punishment. And so is your General Sherman.

If anything can keep cool in this inferno, you're glad it's that big engine back there. A conked-out tank is meat for anti-tank guns!

But her splendid motor roars on. You bless the lads who built each vital part. She's the best!

Special oil coolers for these tank motors that must perform under extreme conditions of temperature and terrain are among the more than 100 war items being produced today by Borg-Warner companies.

Many of these products are going to the fighting fronts in material produced by your industry. And, as in our peacetime work with you, our guiding principle in this war-time partnership is—"design it better—make it better."

This is the principle which we will carry forward into the post-war

world when your energies and ours will again be teamed to supply the tremendous accumulation of civilian needs.

Partners with the makers of diesel units in peace and war, Borg-Warner supplies these and other essential parts . . .

SUPERCHARGERS INDUSTRIAL

ENGINEERING

BW

PRODUCTION

**CLUTCHES AND
POWER TAKE-OFFS
CHAIN DRIVES AND
FLEXIBLE COUPLINGS
REVERSE GEARS**

BORG-WARNER

Peacetime makers of essential operating parts for the automotive, aviation, marine and farm implement industries, and of Norge home appliances . . . these companies which form the Borg-Warner Corporation are today devoted exclusively to the needs of war: BORG & BECK • BORG-WARNER INTERNATIONAL • BORG-WARNER SERVICE PARTS • CALUMET STEEL • DETROIT GEAR AIRCRAFT PARTS • INGERSOLL STEEL & DISC • LONG • MARBON • MARVEL-SCHEBLER CARBURETOR • MCCULLOCH ENGINEERING • MECHANICS UNIVERSAL JOINT • MORSE CHAIN • NORGE • NORGE MACHINE PRODUCTS • PESCO • ROCKFORD CLUTCH • SPRING DIVISION • WARNER AUTOMOTIVE PARTS • WARNER GEAR



● More and more, designers of tomorrow's products are incorporating WESTON all-metal thermometers in their specifications because of the many advantages these thermometers provide.

For critical temperature requirements, its 1% full scale accuracy, and its ability to maintain that accuracy over longer periods, are most appealing. This long-term accuracy is made possible by WESTON's simplified, all-metal thermometer construction. There is no gas nor liquids employed, no capillary, no involved mechanisms. Simply one moving part, and even that part is made of enduring metal. Thus it withstands vibration and over-ranging, and is self-protected against mechanical abuse. Moreover, it has an attractive, dial-type scale which can be read from a distance, *easily and accurately!*

What appeals to designers of all types of equipment and appliances, however, is the fact that the physical form of this thermometer lends itself so readily to problems of design. It can be designed *into* a product, rather than made an accessory thereto.

While sales of WESTON all-metal thermometers are at present limited to essential requirements, descriptive bulletin giving complete specifications will gladly be sent to design engineers on request. Weston Electrical Instrument Corp., 579 Frelinghuysen Ave., Newark 5, N. J.

WESTON

All-Metal Temperature Gauges

haul. The results obtained from such an overhaul, an increase of from 2½ to 3 kwh per gallon of fuel consumed, warrant the expenditure in time and money to say nothing of the elimination of trouble.

As a parting thought the writer wishes to explain one other item. When attempting a major overhaul of this nature, it should be planned well in advance. Materials needed should be on hand, tools in so far as ascertainable, should be ready and the whole operation should be carried on under the supervision of a factory representative who is thoroughly familiar with all the various parts, settings, tolerances and operation of the equipment, because it is always necessary to make readjustments to equipment after changes have been made in such a major overhaul. Then too, with replacement parts varying as they do under present economic conditions, the factory representative who meets problems of this nature in his daily routine is always in a position to make suggestions which will save time and money, and keep your outage for repairs to a minimum. This is of vital import when every minute of operation counts.

Personnel Transport Plane Used by Cooper-Bessemer

RECOGNIZING the advantages of conserving valuable travelling time between their two plants at Mount Vernon, Ohio, and Grove City, Pa., officials of The Cooper-Bessemer Corporation have acquired a five-passenger airplane which enables members of this manufacturer's executive staff to traverse the 160 miles separating the two plants in about one hour as against five to six hours required in these days of restricted motoring speeds and congested railroad service.



Personnel plane used by C-B executives to conserve time.

In addition to inter-plant use, the plane will save a great amount of valuable time in emergency trips to the company's branch offices throughout the country. One of the first long flights of this type was made recently when

A New Type of Ship Follows Her ...with the Same Type of Diesel

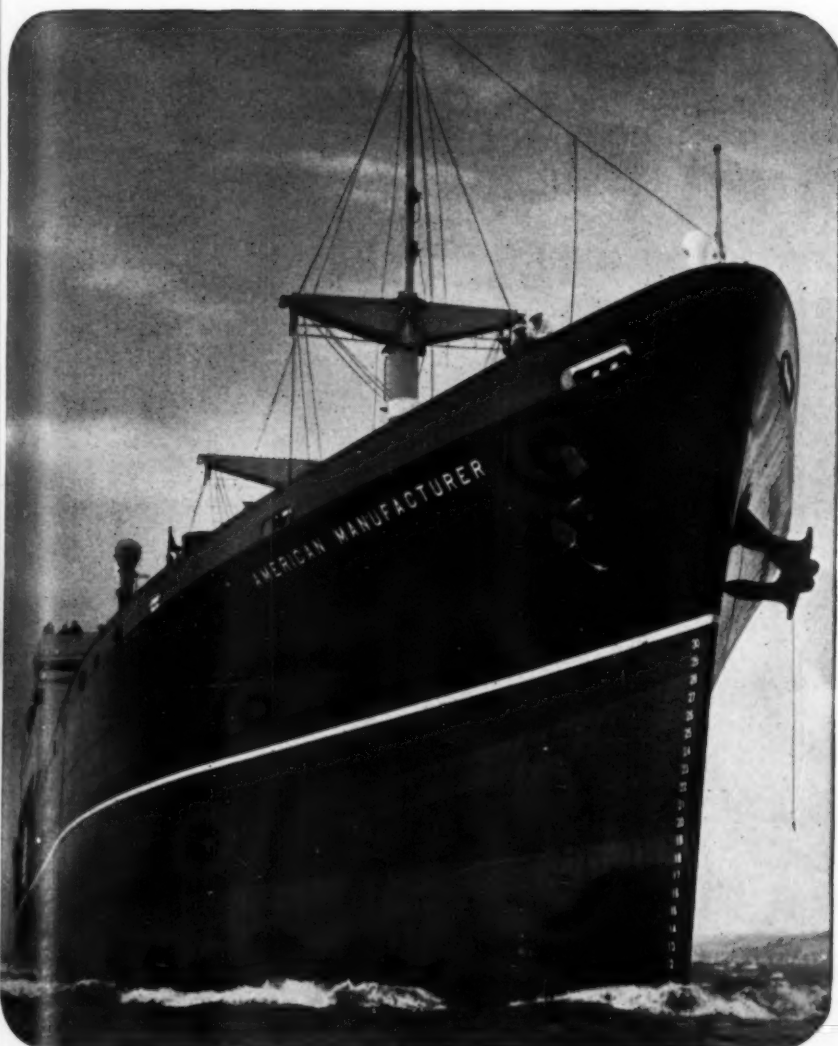
Below is a picture of the U. S. Maritime Commission ship American Manufacturer. She is one of the C-1 vessels propelled by Busch-Sulzer Diesel engines. The C-1's are giving a good account of themselves delivering war cargoes on fighting fronts the world over.

Now a new type of Maritime Commission vessel will carry the battle to the enemy—the C1-MAV-I. Busch-Sulzer is proud, of course, that its Diesel engines on C-1 ships

made a reputation that has earned them the privilege of powering the new vessels. That reputation stems from nearly half a century of producing Diesel power noted for low operating cost, low maintenance cost and reliability. These factors will be offered to you when Victory ends our present schedule of 'round the clock production for the Army, Navy, Maritime Commission and high priorities only.



**BUSCH-SULZER BROS.—DIESEL ENGINE COMPANY
SAINT LOUIS**



**AMERICA'S OLDEST
BUILDER OF
DIESEL ENGINES**

several Cooper-Bessemer officials flew from their Mount Vernon headquarters to their Dallas, Texas, office.

The plane, a modern Fairchild low-wing monoplane coupe, powered by a Wright Whirlwind seven-cylinder motor, has a top cruising speed of about 160 miles per hour, with a fuel range of 600 miles. The aircraft, piloted by Emerson Bennett, former flying instructor and Ferry Command pilot, is equipped with modern flight instruments, two-way radio, retractable landing

gear and variable pitch propeller.

The acquisition of this modern airliner is another example of Cooper-Bessemer's far-sighted efforts to increase efficiency and speed their production of Diesel and gas engines, compressors and auxiliary equipment vital to the war effort.

New Bulletin "Tells" Rather Than "Sells"

MORaine Products Division of General Motors has just published an engineering man-

ual about one of its products, Porex, a unique porous metal produced by powder metallurgy. The book is designed to provide engineering data and basic information essential to the application of Porex which has been developed by this company. The manual describes the product, illustrates its application as a medium of filtration, separation, diffusion, flow control and other functions. Emphasis has been placed on "telling" rather than "selling."



Where heat removal from oil, water and other liquids requires a small, lightweight, compact unit—

You'll want to know about

ROSS "BCF" COOLERS

for these diversified functions

LUBRICATING OIL

Aircraft Engine Test Stands
Engines (Diesel and Gas)
Gears
Machine Tools
Thrust Bearings
Turbines

OIL PUMP SYSTEMS

CUTTING OIL

HYDRAULIC COUPLING OIL

QUENCHING OIL

TRANSFORMER OIL

HYDRAULIC PRESSES

PLASTIC INJECTION

MOLDING MACHINES

JACKET WATER

Aircraft Engine Test Stands
Compressors
Engines (Diesel and Gas)

SMALL VAPOR CONDENSERS

CONDENSATE COOLERS

DRAIN COOLERS

WATER HEATING

WATER COOLING



COMPLETE DETAILS
IN FOLDER 4922

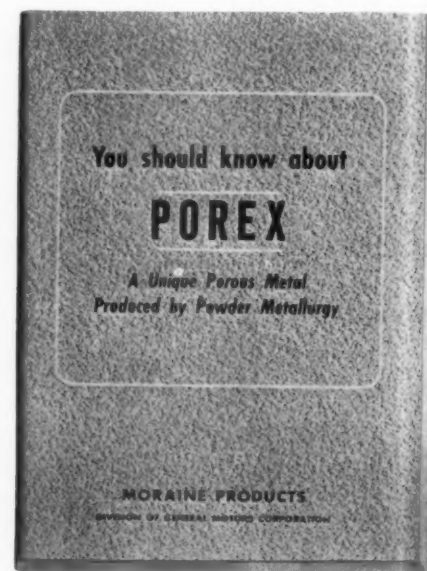
write today!

ROSS HEATER & MFG. CO., Inc.

Division of AMERICAN Radiator and "Standard" Sanitary Corporation

1425 West Ave.

Buffalo 13, N. Y.



The new Porex bulletin issued by Moraine Products Division of General Motors.

The manual states that Porex is a new metal, structurally—a phenomenon of powder metallurgy which extends the realms of metal to certain specialized fields which have previously been closed. This porous metal is approximately one half void and is produced by bonding together, metal to metal, of small spheres. The spheres are carefully graded and the final sintered product is a metal of controlled porosity, containing no impurities or other elements.

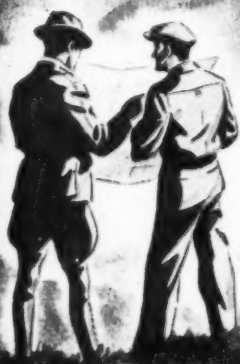
To meet the requirements of various fields of application, Porex is made in four grades, ranging from coarse to very fine. It comes in various shapes to meet varied requirements. Porex applications are being used in the automotive, tractor and refrigeration fields, on Diesel engines, oil burners, aircraft engines, pneumatic tools and equipment, instruments and controls and in the textile and plastic industries.

The major portion of the booklet is devoted to tables, charts and other engineering data to aid the designer in his work. This manual may be had if request is made on company letterhead giving name and title of person requesting. Address requests to Moraine Products Div., General Motors Corporation, Dayton, Ohio.

**Tough going takes
tough precision parts**



McQUAY-NORRIS
ALUMINIZED
PISTON RINGS



Wherever Diesel engines toil at their rugged work, tough McQuay-Norris parts are on the job. Leading builders of Diesel engines know that these parts, products of a company that has specialized in making precision parts since 1910, can always be depended upon for efficient, economical performance. Send us your blueprints.



*Awarded to two plants
McQuay-Norris Ord.
Management Division*

McQUAY-NORRIS

MANUFACTURING COMPANY

ST. LOUIS, MO.



PRECISION WORKERS IN IRON, STEEL, ALUMINUM, BRONZE, MAGNESIUM

Perfect Circle Announces Personnel Changes At Hagerstown Plant

PERFECT Circle has made several changes in personnel at the Hagerstown, Indiana plant to meet the increased demand for automotive rings according to George H. Keagy, plant manager. Also, certain types of aircraft ring production has been moved from the Hagerstown to the Richmond plant.

Willard J. Stahr, former official at Hagerstown,

has been named assistant plant manager. He has been personnel manager of the Richmond plant since its opening.

J. C. Linn, one of Perfect Circle's oldest employees in point of service, was named consulting engineer in the revised set up, so that his services will be available to all Perfect Circle plants.

The following organization will constitute the management of factory departments:

Factory superintendent, W. E. McCullough; machining superintendent, George Clampitt; general foreman, first shift, Maurice McKinnon; general foreman, second shift, Smith Doughty; general foreman, third shift, Brook Wiggins; chief inspector, Kenneth Bird; assistant chief inspector, first shift, Clovis Downing; assistant chief inspector, second shift, Don Pass; assistant chief inspector, third shift, Howard Farmer.

Plant engineer, F. D. Lichtenberg; process superintendent, Ted Knose; chief tool engineer, William Small; tool room supervisor, Lodge Chard; process engineer, A. P. Schramm.

Building superintendent, Voyle Allen; maintenance foreman, first shift, Frank Sherry; maintenance foreman, second shift, Allen Creekbaum.

Methods engineer, M. F. Adamson.



STANDARD jobs or special installations—Young heat transfer specialists take them right in stride. No industrial or military service problem is too tough to tackle—too complex to solve. Principal features common to standard Young Heat Exchangers are: ★quality materials and construction ★choice of sizes and types ★adaptability to a wide range of uses ★ease of installation and ★provision for expansion and contractions of tube bundles with temperature variations. Illustrated above (numbers 1 and 3) are Young standard design tube bundle and shell heat exchangers. No. 2 is a specially engineered unit for marine use and No. 4, an inexpensive oil cooling unit produced in quantities for a low capacity requirement. Heat exchangers are only one of the many heat transfer products that Young manufactures. If your problem is heat transfer, consult Young engineers.

YOUNG RADIATOR CO., Dept. 234B, Racine, Wis., U. S. A.
Distributors: Wrightson-Campion, New York, N. Y. — W. P. Nevins Co., Chicago, Ill. — The Happy Co., Tulsa, Okla. — Calmes Engineering Co., New Orleans, La. — A. R. Flournoy, Bell (Los Angeles), Calif. — C. H. Bull, San Francisco, Calif. Export: Ameresco, Inc., New York, N. Y.

YOUNG

BUY BONDS
PRODUCE MORE
SALVAGE SCRAP
WIN THE WAR

HEAT TRANSFER PRODUCTS

Oil Coolers • Gas, Gasoline, Diesel Engine Cooling Radiators • Intercoolers • Heat Exchangers • Engine Jacket Water Coolers • Unit Heaters • Convectors • Condensers • Evaporators • Air Conditioning Units • Heating Coils • Cooling Coils • and a Complete Line of Aircraft Heat Transfer Equipment.

Army Ordering Heavy Diesel Trucks

BASED on its findings that a single ten-ton truck is better than two five-tonners or five two-tonners, the Army will receive approximately twice as many heavy trucks in 1944, as it did in 1943. The War Production Board has already indicated its approval of doubling this year's production of heavy trucks, at the same time authorizing a large increase in truck production for the home front.

Mack Trucks, Inc., which supplied many of the bigger vehicles to the Army in 1943, has had this year's quota of heavy Army vehicles increased by two-thirds over last year's total. When questioned, Mack executives explained that the bigger trucks offered the Army a number of advantages, among them: The heavy trucks require less personnel since one truck replaces several lighter ones; their fewer numbers demand less home and field service shops; but most important from the Army's point of view, a smaller number of units means less road congestion.

The switch in the Army program is the direct result of actual battle requirements. At first it was believed that light trucks were the answer to all around military transport needs, but as early as the war in North Africa the Army began shifting its emphasis to heavy trucks.

In changing the emphasis from light to heavy trucks, the Army also is making its first large scale purchase of ten-ton Diesels, marking the Army's first departure from gasoline engine vehicles.

*Its Diesels are
protected by Pierce!*



HOW TO MAKE YOUR GOVERNORS LAST!

Like others manufacturing for war needs, Pierce production is for war and essential industry. For this reason new governors can be supplied only on a priority basis. But Pierce calls attention to these easy measures which will make your present Pierce Governors last and give the best service.

- **CLEAN GOVERNORS** once a month with kerosene, gasoline, or prepared cleaner.
- **INSPECT AND CHECK GOVERNORS** each week when in continuous operation.
- **CHECK OIL LEVEL** every day in manually lubricated governors. Use the same grade oil as recommended for the engine.
- **LINE UP** driving pulleys or gears accurately when reassembling governor after cleaning.

Should your governor need repair or reconditioning send it to the factory with the necessary preference rating certificate.

● Among the world's largest ocean-going tugs, the U. S. Maritime Commission V-4's are powered to tow anything afloat. Pierce Flyball Governors were selected to protect the engines against any destructive over-speed which might occur.

This is only one of the many widely varied and vital war-time applications of Pierce Governors on every type of Diesel operation . . . industrial, automotive or marine . . . where effective and dependable control of

engine speed and power is required.

Two types of Pierce Governors are available for Diesel engines . . . driven either independently of the fuel pump, or directly from the fuel pump shaft.

Pierce Flyball Governor's rugged and sturdy construction assures the maximum of service life and dependability. Pierce engineers, with their wide engineering knowledge and long experience, are always ready to help you with your governing problems.

THE PIERCE GOVERNOR COMPANY, INC., 1603 Ohio Avenue, Anderson, Indiana

Standard Equipment on Many of the World's Leading Diesel Engines

Pierce Governors

STANDARD SINCE 1913

Star Electric Motor Wins Renewal of Army-Navy "E"

STAR Electric Motor Company was notified on December 11, 1943 that it had won for the second time, the Army-Navy "E" Award for meritorious service on the production front.

The white star, which the renewal adds to the Army-Navy "E" Flag, is a symbol of appreciation from our Armed Services for the continued effort and patriotism of Star workers.

Titeflex, Inc. Is the New Name of Titeflex Metal Hose Co.

THE Titeflex Metal Hose Co. will hereafter be known as "Titeflex, Inc." The change to Titeflex, Inc. has been announced by Mr. Elbert E. Husted, President of the company.

Since 1914, the Titeflex Metal Hose Co. has specialized in the manufacture of flexible metallic tubing for the conveyance of fluids and gases for general industrial and automotive applica-

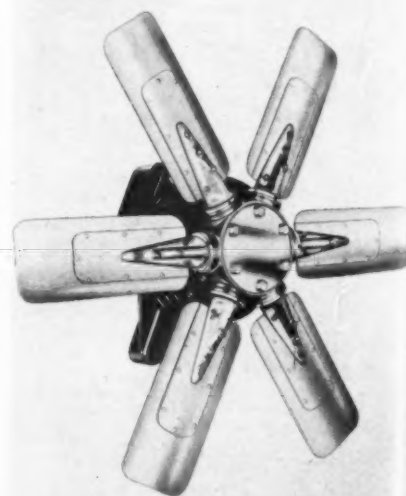
tion. More recently, Titeflex, Inc. has become a producer of radio and ignition shielding for aircraft and automotive engines.

The change of name to Titeflex, Inc. has been made with the realization that "Titeflex Metal Hose Co." is no longer descriptive of all the products manufactured by the company. After the war—this will be even more true, as Titeflex, Inc. anticipates the manufacture and sale of a broader line of products to a wide range of industries.

Titeflex, Inc. will continue to manufacture and develop a complete line of flexible metal hose assemblies for industrial, automotive, and aviation use. As a pioneer manufacturer of this type of tubing, it is expected that flexible metal hose will always be an important part of the company's production.

Kontrol Fan Announces Product Improvement

AN improved controllable-pitch fan kit is announced by Kontrol Fan, Inc., manufacturers of this new type temperature control for internal combustion engines. The major change in the design of the latest model is that the controlling thermal element is direct-connected through the fan spindle to the blade-turning mechanism. This results in an extremely compact assembly. Earlier Kontrol-Fans used separately attached thermal units, and the fan blades were rotated or feathered by means of simple outside linkage.



New controllable-pitch fan kit with controlling thermal element direct-connected through the fan spindle.

None of the basic principles of operation has been altered, however. The entirely automatic

What's New in ENGINE INDICATOR DESIGN AND APPLICATION

COMPLETE
Portfolio

42 Pages—49 Drawings
59 Illustrations

UNIQUE
Diesel Dial

Automatically Correlates Cylinder Pressure and Exhaust Temperature Readings to Show at a Glance Defects in Engine Operation. Supply is Limited.

BOTH ARE FREE!
RETURN COUPON NOW

Bacharach
INDUSTRIAL INSTRUMENT CO.
7000 Bennett St., Pittsburgh 8, Pa.

Send me FREE Diesel Dial and Portfolio on "What Is New In Engine Indicator Design and Application".

NAME _____ POSITION _____
COMPANY _____
CITY _____ STATE _____ D

YM ANNOUNCES NEW "ROBOT" OIL REFINER

**Designed for Continuous, Automatic
Cleaning of Diesel Lube**

A new line of YM "Robot" Oil Refiners, to clean Lubricating Oil with continuous and automatic operation, has been announced by the Youngstown Miller Co., Sandusky, Ohio. This machine, which is said to add new efficiency, convenience and economy to the widely used process of

YM Engineering now proudly announces the new YM Robot Oil Refiner—to serve stationary and marine diesel engines with *continuous* and *automatic* operation in cleaning diesel lubricating oils.

- ★ YM can make a guarantee on removing and preventing recurrence of piston varnish and sludge deposits through the use of the Robot.
- ★ Uses bulk earth that can be bought on the open market.
- ★ Can remove fuel dilution, acids, solid and colloidal carbon, dirt and similar matter . . . and can even restore oils emulsified by water!
- ★ One machine serves the entire power plant.
- ★ It can reclaim truck oils, ice machine oils and can restore transformer oils to 30,000 volt dielectric strength.

Send for proposal on equipment suitable for refining your oils...

THE YOUNGSTOWN MILLER COMPANY
SANDUSKY, OHIO

variable-pitch fan continues to be actuated by a thermostatic element directly controlled by the temperature of by-passed engine jacket water. As engine temperature goes up, fan blade pitch increases at the same time, providing greater cooling. When the engine is cold, fan blades remain at zero or low pitch until correct operating temperature is reached. No water jacket obstructions restrict the free circulation of the coolant used. Fan blades feather from practically zero to as much as 38 degrees pitch, and hold engine temperatures within safe, narrow ranges

under all load and climate conditions. The fan units may be used for gasoline, natural gas and Diesel engines; may be installed in heavy, powered industrial equipment and are applicable to many other cooling jobs where automatic thermostatic control is required. The new variable-pitch fan kits use control thermostats manufactured by the Detroit Lubricator Company.

Results from installations of Kontrol-Fan units are said to include the reduction of lubrication oil consumption, reduced engine repairs, re-

duced power absorbed by the fan during its low pitch operation, reduced crankcase sludging, and the maintenance of highest engine performance, as well as savings in power and fuel costs.

Ohio Crankshaft Revises Booklet On High Frequency Induction

HOW one large manufacturer saved more than 144,000 lbs. of nickel in a year through adopting plain carbon steel and hardening it with the high frequency electrical induction process is one of many interesting cases cited in a revised 32-page booklet just issued by The Ohio Crankshaft Company on the subject of induction heat treatment.

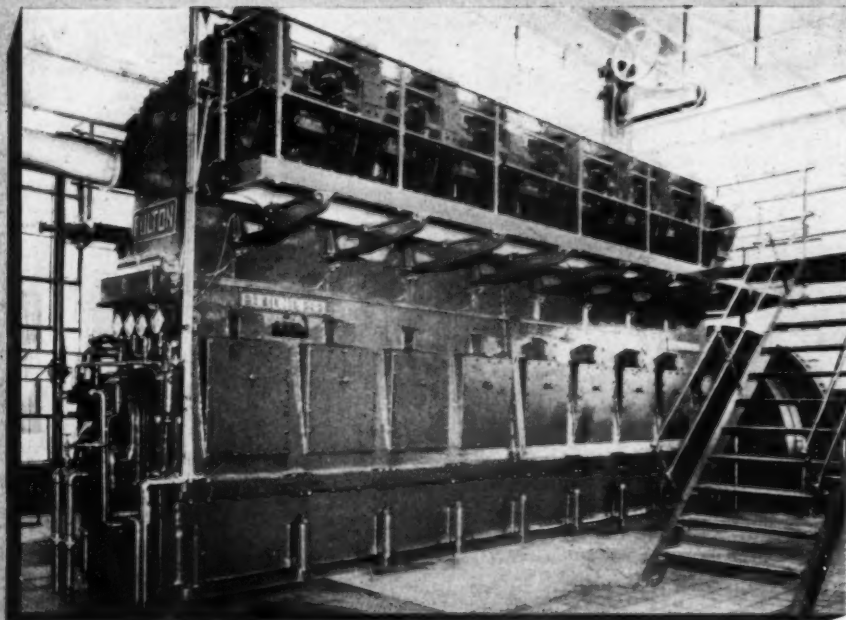
Author of the publication, Dr. Harry B. Osborn, Jr., research and development engineer of the TOCCO Division, is a national authority on the induction process. His booklet is one of the most comprehensive descriptions available today on the ramifications of this amazing industrial tool.

The publication gives evidence of why the induction heat treatment technique has caused the world of metallurgy to alter many of its conceptions of heat-treating practices and metals. Today, many parts formerly made of expensive high alloy steel are now made of low carbon steel, and following TOCCO hardening, are showing resistance to wear far beyond fondest dreams.

Well illustrated, the booklet shows recent installations of the TOCCO Process as well as a series of views of various types of parts easily treated by induction. The publication is divided into chapters on heat treating applications so that the reader obtains an understanding of the principles of induction hardening, heat treating, brazing and soldering, normalizing and annealing and heating for forging and forming.

Other chapters deal with carbide solution and superhardness. Tables and charts reveal hardness tests, power effects, etc. An interesting section touches upon the development of induction heating as a medium for hardening long cylindrical lengths, bars and tubes. A special fixture designed for this application is expected to open a new field for use by steel mills. It will enable them to run special small lots for a customer without using costly furnace operations. The booklet is available by writing the TOCCO Division of The Ohio Crankshaft Company, Cleveland 1, Ohio.

1852 SUCCESSFUL ENGINE BUILDERS 1944 FOR 92 YEARS



Ninety-two years is a long time — yes, not far from a century of Engine Building Experience — to back up the Fulton Diesels we shall build for the peace-time World. In better than nine decades we have learned how to design and build Diesels for long, carefree, dependable and profitable service — with nothing left to guess work. These characteristic qualities of Fulton Diesels have been demonstrated in practically every type of stationary application — continuously for many years.

625 H.P. to 2000 H.P.

FULTON IRON WORKS CO.
• ST. LOUIS • MISSOURI •

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America's only Radial Air-cooled Diesel Engine

- No Fire Hazard
- Lower Fuel Consumption
- Increased Striking Range
- Greater Stamina
- Dependable Operation
- Instant Response to the Throttle
- No Ignition System
- Lower Cost of Fuel
- Constant Torque at All Speeds
- No Radio Interference

Guiberson's present world leadership in the field of radial diesel engineering began more than fourteen years ago when Guiberson engineers developed the world's only high-speed air-cooled radial diesel engine. Eleven years ago the first Guiberson-powered plane took to the air and the first A.T.C. certificate for the Guiberson radial diesel engine was granted. Eight years

ago the first Guiberson radial diesel took its place in the tanks of our first armored force. Today the Guiberson radial diesel engine provides dependable, low-cost, fire-safe power that will help America win the edge that is needed for victory—and it is the power plant that will win leadership for America in the field of post-war transportation on land, on sea, and in the air!

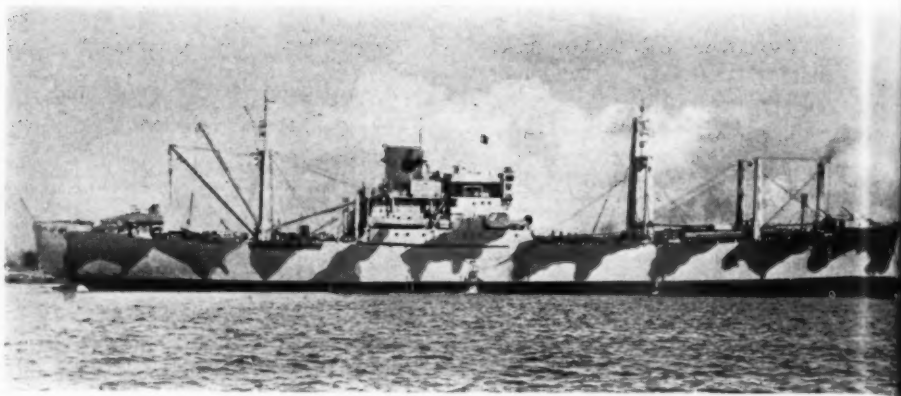
Established  1919

Guiberson U.S.A.

GUIBERSON DIESEL ENGINE COMPANY THE GUIBERSON CORPORATION
Dallas, Texas Aircraft and Heater Division

Diesel Auxiliary Freighter Survives Jap Torpedoes

THE recent sensational account of the experiences of the *Alchiba*, Navy cargo vessel which refused to be put out of action despite two direct hits by Jap torpedoes, attests to the heroism of her crew and to the rugged dependability of American-built ships and equipment. First merchant ship in the South Pacific to receive a presidential citation, news of the *Alchiba*'s outstanding performance was of particular interest to workers of The Cooper-Bessemer Corporation who built the Diesel engine generating sets with which this vessel is equipped. The Navy report revealed how the *Alchiba*, loaded with gasoline and high explosives, was first torpedoed off Guadalcanal on her fourth trip to this South Pacific war zone. Despite resulting explosions and fires, Captain James F. Freeman, then commander, successfully beached the ship and directed his crew while they brought the flames under control and salvaged all but 300 tons of cargo. According to the Navy's account, a second Jap torpedo struck the *Alchiba* ten days later, flooding the engine room and resulting in such extensive damage that the ship was announced lost in a communique issued by the Navy Department. This report proved unfounded, for again salvage crews fought the



Navy cargo ship "Alchiba," twice torpedoed while on duty in the South Pacific, is equipped with Cooper-Bessemer Diesel generating sets.

Official U. S. Navy Photographs.

fires and made the *Alchiba* seaworthy. Proceeding under her own power, she was brought safely through a 5800-mile trip to a U. S. west coast port where she was subsequently overhauled and put back into service. Although the Navy reports did not officially disclose whether the four Diesel-electric generating sets were disabled during the actions, it was pointed out these units apparently continued in operation to assist salvage work and to permit the vessel to make her way home despite severe damage to hull, main engine room and keel.

Fire and damage resulting from torpedoing brought under control.



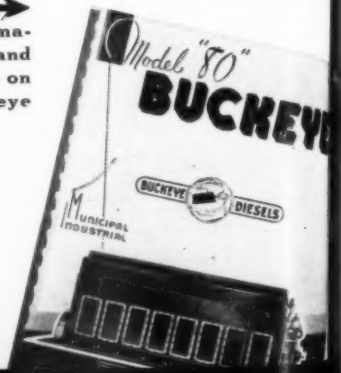
Engine Builders Since 1908



We are learning how to build better Diesels—learning a lot in a short time under the pressure of war production. All of our 33 years' engine building experience, prior to the war, plus our concentrated war production experience—plus our greatly expanded plant and engineering facilities will find expression in better Buckeye Diesels for powering the post-war world. These will be the widely known and basically dependable, economical Buckeye Diesel power units with added refinements in materials, workmanship and distinctive Buckeye protective devices.

Write for this 32-page informative engineering and application bulletin on Model "80" Buckeye Diesels.

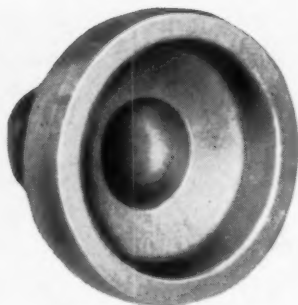
Direct Drive or Electric Units 75 HP to 960 HP.



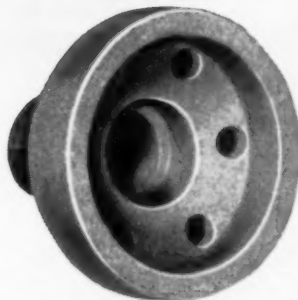
BUCKEYE DIESELS

have always been good

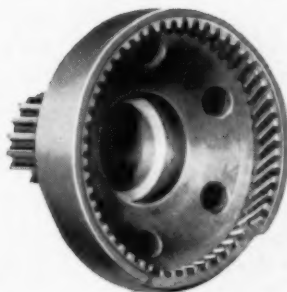
Be Profitwise and Dieselize with Buckeyes
THE BUCKEYE MACHINE COMPANY LIMA, OHIO



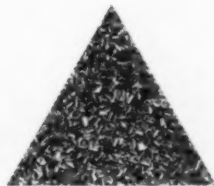
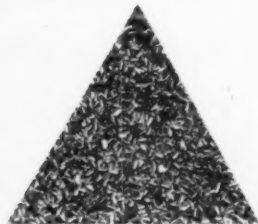
Former stock, 8-2/10 lb.
4-9/10 lb. of metal
to be removed.



ArmaSteel casting, 5-7/10 lb.
2-4/10 lb. of metal
to be removed.



Finished part, 3-3/10 lb.



2-5/10 Pounds Less Metal to be Machined on Transmission Drum for Tank
These comparative figures indicate part of the saving effected by ArmaSteel: Weight of forging formerly used—8-2/10 pounds; weight of ArmaSteel rough casting—5-7/10 pounds; weight of finished part—3-3/10 pounds.

Chips Are Out When "The Chips Are Down"

ArmaSteel*

With wartime schedules calling for more and more efficiency in the utilization of time and manpower, men who "call the signals" on plant production begrudge the hours wasted turning out chips.

That's one reason why ArmaSteel castings have replaced steel forgings and bar stock in the production of many vital parts. Cast to conform closely to finished shapes, they cut down machining time as much as 50 per cent—reduce the volume of chips and step up the volume of production. On

top of this saving, ArmaSteel is far more machinable than the alloy steels it replaces, stretching the period of service between tool grinds.

Other qualifications of ArmaSteel include exceptional adaptability to selective hardening, high fatigue life, good corrosion resistance and excellent bearing properties. Investigate the advantages of applying ArmaSteel to your immediate production, and keep ArmaSteel in mind for products in the blueprint stage.

**SAGINAW MALLEABLE IRON
DIVISION OF GENERAL MOTORS
Saginaw, Michigan**

You'll be
glad you did
**BUY EXTRA
WAR BONDS**

CAST FOR A LEADING ROLE IN INDUSTRY

Gray Marine President Favorably Views Post-War Marine Diesel Outlook

"OWNERS of larger yachts are keenly interested in marine Diesel developments which will come out of the war as the result of U. S. navy experience with this type of power," says John W. Mulford, president of the Gray Marine Motor Company, Detroit, Mich.

"While it is too early to talk of 'things to come' in the field of Diesel propulsion for pleasure

boats of the cruiser type, it is definitely indicated that many boats now powered with twin installations of gasoline engines will be repowered with two cycle, high speed marine Diesels after the war. This can be expected, not only because mass production of Diesels will result in substantially lower prices, but because operating and performance experience in tens of thousands of war craft has widened the scope of utility for Diesel engined boats in general.

"Before the war it was believed that Diesels

were limited to boats operating on long trips where fuel economy under sustained performance justified the higher initial cost of Diesel engines. In the post war period, Diesel engines will be sufficiently low in cost and so flexible in operation that hundreds of gas engine replacements will be made. Even with the present type of marine Diesel as used by the Navy it has been proved that Diesel propulsion for small craft has many advantages over gasoline engines in many important respects. With post-war developments now in the offing, tomorrow's marine Diesel will be adapted to heavier types of boats requiring over one hundred horsepower and many boats in the smaller power range.

"The war alone has been responsible for crowding at least ten normal years of Diesel progress into the short space of two years. During this period Gray has supplied more two cycle marine Diesels than were produced in the entire United States previous to Pearl Harbor . . . more engines in fact than Gray expects to build in the next decade for peace-time usage. Before the war Gray had one plant, now it has six . . . each 100 per cent engaged in turning out marine Diesels and gasoline engines for navy and army requirements. Most of these engines are used in landing boats and invasion Tank Lighters up to 105 feet in length."

Young Radiator Appoints Chicago Representatives

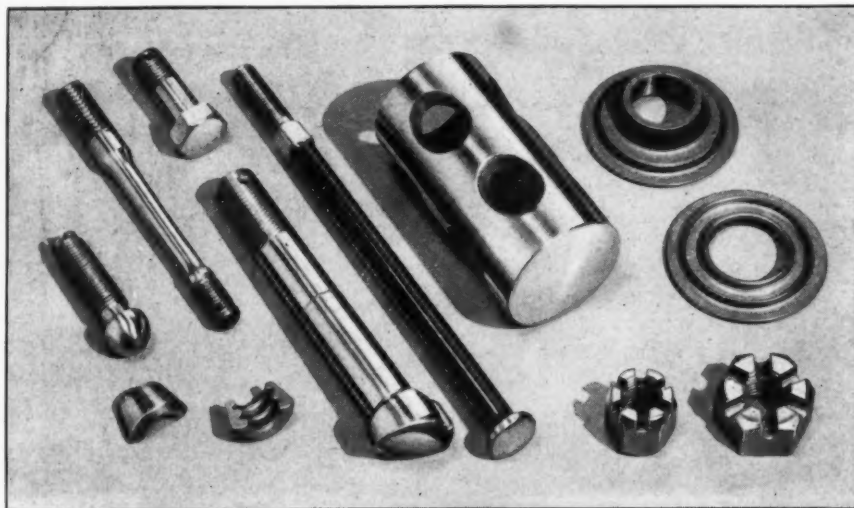
YOUNG Radiator Company, manufacturers of heat transfer products for building, aircraft, automotive, marine, industrial, transportation and related fields, announces the appointment of the W. P. Nevins Company as Sales & Engineering Representatives in the Chicago territory (including Lake and Cook counties in Illinois and Lake and Porter counties in Indiana).

The W. P. Nevins Company will provide a complete sales and engineering service on the line of Young Heat Transfer Products including unit heaters, coils, air conditioning units, engine jacket water coolers, heat exchangers, Quaker (radiator type) coolers and condensers and evaporative type cooling units.

The engineering associates of Mr. Nevins, who will work with him in the territory, are Mr. C. L. Carlson and Mr. F. L. Winkler.

Caterpillar Appoints Kenneth F. Park

ANNOUNCEMENT was recently made by H. Howard, General Sales Manager, Caterpillar Tractor Co., of the appointment of Kenneth F. Park to the management of the Sales Division.



"CHICAGO SCREW" Aircraft Quality Hardened and Ground Products

People who are in a position to speak from experience are generous in their praise for the hardened and ground parts made by The Chicago Screw Company.

Serving the Armed Forces, the Diesel Engine field and many other industries, we are specialists in the manufacture of Valve Tappets, Push Rods, Valve Spring Retainers, Connecting Rod Bolts, Studs, and other related products . . . All operations are handled

within our own plants. This includes all secondary operations such as Slotting, Milling, Drilling, Broaching, Hardening, Grinding, Thread Grinding, Thread Milling, etc.

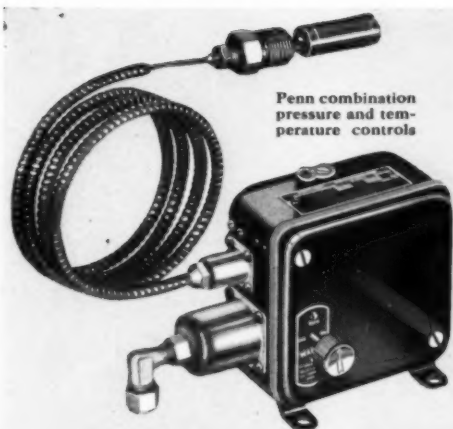


THE CHICAGO SCREW CO.

ESTABLISHED 1872

1026 SO. HOMAN AVENUE

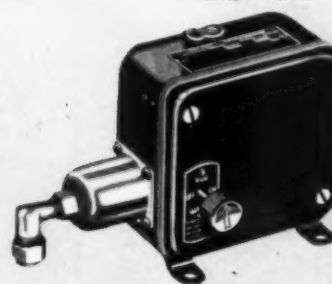
CHICAGO, ILL.



Penn combination
pressure and tem-
perature controls



Penn cooling water
temperature control



Penn oil pressure
safety controls

NOW You Can **PROTECT** Your Engines

● Apply Penn safety controls and *you have automatic protection* against possible damage in case the oil pressure drops dangerously low, bearings become overheated, or cooling water system fails.

Three basic models are available... combination pressure and temperature... oil pressure only... and water temperature only. Models are available for bearing temperature control and for protection of pressure lubricated machines.

Penn controls are *easily installed on new engines as well as on engines now in service.* Their exceedingly low cost protection is especially important now, when power interruptions are costly and repairs difficult. Write now for detailed information—ask for Catalog E-100A. *Penn Electric Switch Co., Goshen, Indiana.* In Canada: Powerlite Devices, Ltd., Toronto, Ontario.

A Few Typical Functions of PENN CONTROLS

DIESEL APPLICATIONS

Sounds an alarm only... closes magnetic fuel valve and sounds alarm... closes magnetic fuel valve only... closes magnetic fuel valve and opens pilot relay.

BATTERY IGNITION APPLICATIONS

Opens battery circuit and sounds an alarm... sounds an alarm only... opens battery circuit only.

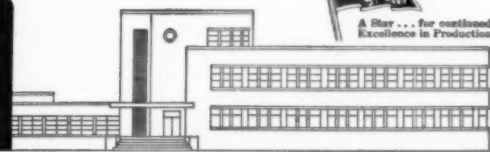
MAGNETO IGNITION APPLICATIONS

Sounds an alarm only... grounds dual magneto... grounds magneto only... grounds magneto and sounds an alarm or lights a signal light.

DUAL IGNITION APPLICATIONS

Opens battery circuit and grounds magneto.

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

velopment Division on January 5, 1944.

Mr. Park, a member of the American Society of Civil Engineers, and a leading authority on earthmoving, has been associated with the heavy machinery business in the capacity of earth-mover or equipment man since 1926.

During the first World War, he was connected with the shipyards in Seattle, Washington on acetylene welding and burning work and fol-

lowed this with seven years in selling and advertising work.

In 1926 he returned to the earthmoving field, supervising the construction of extensive irrigation projects, levees, and protective embankments, on the Pacific Coast. When construction of the huge Boulder Dam in Nevada started, it became necessary to build a road between the dam-site and Boulder City, and the superintendent on this important and difficult project

was Mr. Park.



Kenneth F. Park

Mr. Park is an author of one of the Army manuals, "Principles of Modern Excavation and Equipment," as well as numerous other articles on construction and earth-moving for trade journals. He has also done considerable lecture work for the U. S. Army instructing officers in current methods of earthmoving and construction. He also developed a pocket-size device for estimating earthmoving yardages, costs, times, and distances.

Railway Locomotive Engineer Advises Diesel

"Diesel Locomotives—Mechanical and Electrical Equipment"
by John Draney

TWO new books on Diesel have just come off the press. This set of two volumes will be extremely interesting to everyone interested in the expansion of Diesel Engine use, particularly railroad men—engineers, firemen and maintenance men.

The first volume starts out describing the various types of Diesel engines in a very elementary way. Then the fuel injection pumps, nozzles and combustion are explained in detail. Then other engine accessories are described, which include the lubricating oil system, water cooling system, air filtration and engine governors. There is a very complete chapter on supercharging and turbo-charging.

The next section describes the construction and principal maintenance work required on each make of locomotive engine. After this is a sec-

Wittek Hose Clamps Installed On Diesel Marine Engine

Type FBC

Type RN

Type RM

Type RW

Dependable Hose Connections For Diesels Assured With WITTEK HOSE CLAMPS

Because of their simple design, rigid construction and easy installation, Wittek Hose Clamps assure dependable hose connections for Diesel engine builders. Long accepted by the automotive and aviation industries, Wittek Hose Clamps are now being proven in actual service with the armed forces of the United Nations as standard equipment for aircraft, tanks, jeeps, trucks, ships and other combat vehicles. Wittek Hose Clamps are made in many different sizes and types for Diesel applications: Type RW for hose connections of 5" in diameter and larger; Type RM for 3 1/2" to 5"; Type RN for 2 1/2" to 3 1/2" and Type FBC for 2 1/2" hose connections and smaller. Write for complete catalog. Wittek Manufacturing Co., 4305-15 W. 24th Pl., Chicago 23, Ill.

War Bonds for Victory—Buy MORE in '44!

WITTEK *HOSE CLAMPS*
Dependable Hose Connections



PLAY SAFE!

No one would think of carelessly leaving several thousand dollars in cash lying around unprotected.

A Diesel engine may well be the equivalent of many thousands of dollars, not only in original cost, but in terms of power and the useful work it does.

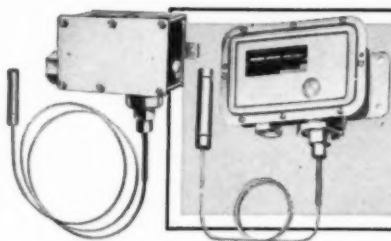
Therefore, it's just plain common sense to protect your investment in power as carefully as you do your cash.

Overheated cooling water or low lube-oil pressure can result in serious damage to an expensive engine, loss of money, and time lost to the war effort.

Your investment in Diesel power can be protected by the installation of "DL" Engine Safety Contact Makers in combination with a suitable alarm system to warn you when a dangerous condition exists or is imminent.

"DL" products are backed by the experience of many years in the manufacture of precision equipment that has earned a world-wide reputation for excellence.

Many "DL" Contact Makers have been especially designed for use on our fighting ships and those of our merchant marine. If you are in need of this type of equipment, we will send you full information on request.



Write for Bulletins No. 203 on Safety Controls, No. 204 on "DL" No. 220 Hi-Shock Contact Makers and Bulletin No. 206 on "DL" No. 250 WT Water-Tight Contact Makers.

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT 8, MICHIGAN

Division of AMERICAN Radiator and "Standard" Sanitary Corporation

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG



"DL" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • Radiator Valves and Balancing Fittings • Arco-Detroit Air and Vent Valves • "Detroit" Expansion Valves and Refrigeration Accessories • Air Filters • Stationary and Locomotive Lubric

tion devoted to the specifications and operating instructions of all the principal sizes and makes of Diesel locomotives. There is also a description of a well arranged railroad repair shop and the details of "A Modest Engine House," especially built for Diesels. The description of equipment for handling Diesel locomotive parts is interesting. Lubrication instructions and charts are shown in detail. The description of trucks and auxiliaries is brief but to the point. The last chapter dealing with the "Vapor-Clarkson Steam Generator" is very complete.

The second volume is entirely on Electrical Equipment. The first sentence is—"What is electricity?" The first few chapters try to answer this question in a very elementary manner. In order to make it as simple as possible to understand, alternating circuits are not described but only the direct current features, as used on the Diesel locomotive. The principal formulas are given for calculating electrical circuits. A detailed description is given to show how to read a wiring diagram. For the few that will be interested, train resistance data is given. The re-

mainder of the volume is divided into three parts, describing in detail the operation and maintenance of the electrical equipment. See advertisement in this issue for prices and ordering information.

Death Claims William G. Irwin, Key Figure in Diesel Industry

WILLIAM G. IRWIN, nationally prominent industrialist, financier and philanthropist and one of the key figures in the development of this country's Diesel engine industry, died suddenly on December 14 in Indianapolis. Mr. Irwin's death, attributed to heart failure, occurred in his offices at the Indiana National Bank, the state's largest financial institution, of which he was president. He was seventy-seven years old.



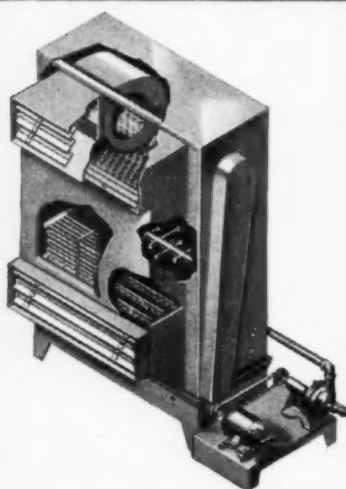
William G. Irwin

The story of Mr. Irwin's part in the development of the high speed Diesel engine had in beginning a quarter of a century ago and forms an interesting chapter in a remarkable career which included participation in many industrial, financial, political, educational, religious and philanthropic activities from coast to coast.

During the last war, in 1918, Mr. Irwin had in his employ, as a chauffeur, a young man whose ambition it was to develop a high speed Diesel engine suitable for trucks, buses, small boats and other types of mobile equipment too small to accommodate the heavy, cumbersome Diesel engines of that day. Always interested in new developments which promised the advancement of industry, Mr. Irwin became convinced of the soundness of the young man's ideas and gave freely of his encouragement and financial backing.

The young man's name was Clessie L. Cummins and out of his early association with Mr. Irwin grew the Cummins Engine Company, which Mr. Cummins today heads as president, and the

WATER SUPPLY for Diesels No Problem with **FAIRBANKS-MORSE** Evaporative Coolers



FAIRBANKS-MORSE Evaporative Coolers are designed to cool the jacket water or lubricating oil of Diesel or gas engines in a closed system. They assure you of fewer shutdowns—less repairs—longer life—more economical over-all performance and protection for your power equipment.

Fairbanks-Morse Evaporative Coolers use *less* water—actually only 5% of the amount generally required for a continuous water supply. They offer a distinct advantage in reduced operating expense where the high cost or scarcity of water is a problem.

Fairbanks-Morse Evaporative Coolers are manufactured in a number of models.

For further information write Fairbanks, Morse & Co., 219 Fairbanks-Morse Building, Chicago 5, Ill.

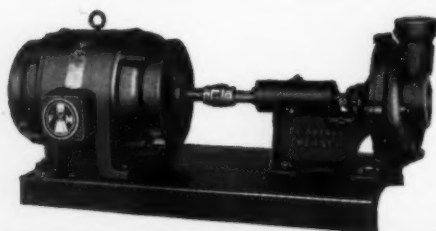
Type "C" Fully Automatic F-M Evaporative Cooler

Illustration shows cut-away view of this model. Automatic dampers are built into the air intake, discharge, and by-pass. When cooler is in operation and jacket water temperature of engine up to desired point, by-pass dampers begin to close and inlet and outlet dampers to open. During operation these dampers fluctuate to keep engine water at the desired temperature. For cooling lubricating oil, this unit is available with separate coil in the same cooler with jacket water coil.

Fairbanks-Morse Pumps and Motors

The use of Fairbanks-Morse pumps and motors on all units assures a complete evaporative cooler with all parts covered by a single guarantee.

Pumps and motors are direct-connected except in the smaller sizes, and are carefully selected for the service required.



FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
GENERATORS

WATER SYSTEMS
SCALES
STOKERS
FARM EQUIPMENT
RAILROAD EQUIPMENT



Diesel Engine
Cooling
Equipment



SELF-PRESERVATION

Self-preservation is the first law of nature and the first duty of Government. In a democracy it is a prime obligation of citizenship. That is why we decided, shortly after Pearl Harbor, to place our entire facilities at the disposal of the Government. By doing so, we believed that our factories could contribute in greatest measure to winning the war.

In past years, it was our settled policy to confine our sales efforts to the commercial fishermen and work boat owners. We preferred to work in a field in which we had long experience, and we did not actively solicit Government contracts. Commercial business is still our decided preference, and we believe that the quickest way to make Atlas Diesels available again to all who want reliable power, is for everyone to pitch in and get this war over with.

In the meantime, we will continue to furnish Atlas Diesels in certain sizes to strategic commercial interests, when the production of such engines does not jeopardize the service we are rendering to the Government.

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND • CALIFORNIA

NORTHWESTERN DIVISION . . . SALMON BAY TERMINAL, SEATTLE, WASH.
EASTERN DIVISION . . . 115 BROAD ST., NEW YORK, N.Y.
CENTRAL DIVISION . . . 228 NORTH LA SALLE ST., CHICAGO, ILL.
SOUTHWESTERN DIVISION . . . 5726 NAVIGATION BLVD., HOUSTON, TEX.
ARTHUR DUVICS' SONS, DISTRIBUTORS . . . NEW ORLEANS, LOUISIANA

ATLAS

Imperial
**DIESEL
ENGINES**

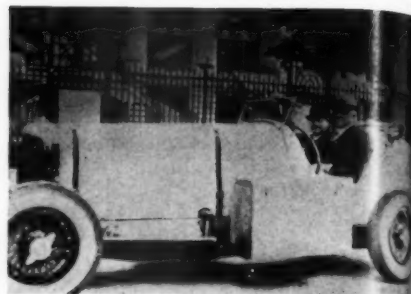
Cummins Diesel Engine, which pioneered the use of Diesels in highway transportation and many other industries.

Although always preferring to remain in the background, Mr. Irwin, as chairman of the board of directors, was continuously active in the company until his death, constantly adding to its resources and facilities through the early stages of growth until, today, it is one of the principal industries of the founder's native city of Columbus, Indiana, and one of the country's

large producers of Diesel engines.

While his extensive interests and holdings were scattered the country over, Columbus was the hub of Mr. Irwin's activities throughout his life-time. There are located the Irwin-Union Trust Company, founded by his father, J. I. Irwin, and the general offices of the Union Starch and Refining Company, both companies which he served as president.

After graduating from Butler University, in



William G. Irwin, at the wheel, with Andre Citroen, on a tour of Europe in 1932, with Cummins Diesel automobile.

Indianapolis, in 1889, Mr. Irwin entered his father's bank as cashier, succeeding his father as president upon the latter's death in 1910. Shortly before the turn of the century, father and son together were active in the organization of the Union Tinplate Company at Anderson, Indiana and Monessen, Pennsylvania, now a property of the United States Steel Corporation, and they also built the first interurban line to enter Indianapolis.

Blackmer Streamlines Mounting For Pumps

Added utility, conservation of space and pleasing "streamlined" appearance are combined in the new base on which these new Blackmer Marine type rotary pumping units are mounted. The fabricated base is made of steel plate, welded construction, and is designed to permit free access to the pump for lubrication and other service operations.



New Blackmer marine type rotary pump unit with fabricated, "streamlined" base.

The pump has a capacity of 100 GPM at 100 psi pressure and is powered by a 15 HP gear head motor, having a speed of 440 RPM on the pump shaft. The unit was developed to handle oils of various types on landing boats and is currently in production at the Blackmer Grand Rapids plant.

WITH their patented Perma-Set Plates for long, uniform service, Globe Spinning Power Batteries have what it takes for easy, dependable, unfailing starting of electric starting Diesels...instant starting at a touch of a button. A Globe Engineer will be glad to survey your needs and submit a recommendation. Address nearest factory.

GLOBE-UNION INC. • Milwaukee 1, Wis.

ATLANTA • BOSTON • CINCINNATI • DALLAS • KANSAS CITY • LOS ANGELES • MEMPHIS
MINNEAPOLIS • PHILADELPHIA • SEATTLE

DP-244

Felt Products Appoints Byron J. Schwinn Automotive and Industrial Division Manager

FELT Products Manufacturing Company announces the appointment of Byron J. Schwinn as Manager of Industrial and Automotive Replacement Divisions, to succeed Clarence A. Troh, resigned.

Mr. Schwinn brings to Felt Products Mfg. Co. many years of successful business experience. For the past twelve years he was assistant branch manager of the Crosley Distributing Corporation of Chicago. From 1939 to 1941 he served as president of the National Electric Credit Association.

In his new capacity, Mr. Schwinn will be responsible for promoting the sale and service of Felt Products Mfg. Company's lines of gaskets, packings and other sealing materials.

GE Annual Review Reveals Important Diesel Developments

Railroad and Industrial

OF PARTICULAR interest among the year's developments in locomotives was the modification of standard 44-ton, and the development of 47-ton, Diesel-electric units to meet the exacting requirements of the Army for use in foreign theaters of war. The locomotives conform to a special international clearance diagram and are provided with special end plates to permit interchange of either standard automatic couplers or special draw-hooks and buffers of the European type, so that the locomotives may be used practically anywhere the gage permits. Most of the units are of standard 56 1/2-in. gage, but special gages were provided when necessary.



GE Diesel-electric, 44-ton, 380 hp., standard gage locomotive.

The standard 44-ton 380-hp. Diesel-electric road-switcher was modified for more ready accessibility of parts for inspection and maintenance. This type of locomotive, introduced in 1940, continued to boom in popularity, with shipments in 1943 about 50 per cent more than those of 1942. A 47-ton Diesel-electric loco-

motive, similar to the standard 44-tonner, was designed with articulated trucks, lower cab, and for narrow-gage rail. Fourteen of them were built for export.

The greatest single achievement of Alco-GE production of Diesel-electric locomotives during the year was the delivery of 44 1000-hp. road-switchers within four months after they were authorized. These locomotives were sent to Persia for use on the Trans-Iranian Railway to move war supplies to Russia. A total of 57 of

these Alco-GE units are in this service, the other 13 being furnished from various railroads in the United States. All 57 are moving war goods over difficult grades and through innumerable tunnels in the approximately 550 miles of this railroad from the Persian Gulf to Tehran, Persia's capital. These locomotives have special 3-axle 3-motor trucks, and couplers conforming to the British system on the railroad, but otherwise are standard units. Many Alco-GE Diesel-electrics were supplied for U. S. railroads, to help them pyramid their already outstanding volume



Perfect Lubrication
Can be attained only by
the Cooperation of . . .

- ✓ THE ENGINE MANUFACTURER
- ✓ THE OIL REFINER
- ✓ THE FILTER MANUFACTURER
- ✓ AND THE OPERATOR

THE PRODUCTION OF IMPROVED LUBRICANTS such as the new Detergent Oils is the responsibility of the Refiner. The maximum utilization of these advancements depends upon the complete cooperation of the Engine Manufacturer, Filter Manufacturer and the Operator.

The advent of the new detergent oils re-emphasizes the importance of the DeLuxe Filter which does not affect the physical or chemical characteristics of any oil. The purpose of the DeLuxe Filter is two-

fold: to remove all foreign matter which induces engine wear and to cleanse the oil of asphaltene and other minute contaminants which in detergent oils are kept diffused but which in regular oils will form sludge, etc., unless the harmful ingredients are removed.

For Full Facts, write for booklet "The Key to Clean Lubrication," sent without cost or obligation. The DeLuxe Products Corporation, 1416 Lake Street, LaPorte, Indiana.

DELUXE



Oil Filter

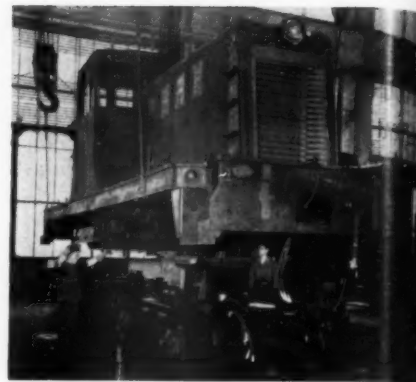
Does More Than Strain Oil . . . More Than Filter Oil . . . ACTUALLY CLEANSES OIL !

of war freight. The production rate nearly tripled during the year.

INDUSTRIAL LOCOMOTIVES

Among the interesting jobs being handled by industrial Diesel-electric locomotives was the 24-

hr., 7-day-week schedule of an 80-ton, 500-hp. standard locomotive in handling the open-hearth high line in a steel mill. Only a routine 8-hr. inspection period per week is required by the locomotive. Incidentally, the steel industry alone in four years has put 60 such units to



Trucks being applied to G-E, 80-ton Diesel-electric locomotive.

work, in sizes from 20 to 80 tons. In a 12-month period industry has put 300 such locomotives to work, in a wide variety of classifications.

Marine Equipment

DIESEL-ELECTRIC DRIVE

Diesel-electric propulsion continued to surge ahead at the rate maintained in 1942, which was the largest year in history for such propulsion. Included were both surface vessels and submarines.

Improvements developed during the year included better ventilation. Also of interest was the application of this form of drive to ships of higher horsepower. Installed horsepower of 11,000 was being considered for several special-duty ships.

During 1943 there were shipped equipments totaling 62 per cent more horsepower than those shipped in 1942. These equipments are used for propelling minesweepers, harbor tugs, submarines, tankers, salvage vessels, net tenders and fleet tugs.



Adel Precision Products Corp. Creates New Diesel Equipment Division, Also Announces Personnel Changes

CREATION of a new Adel Diesel and engine equipment division to be headed by Wing Commander J. G. Goodenough, prominent internal combustion engineer, was recently announced by Ray Ellinwood, president, Adel Precision Products Corp.

In making the announcement, Ellinwood emphasized that immediate production of Diesel

DIESEL MARINE AUXILIARY UNITS

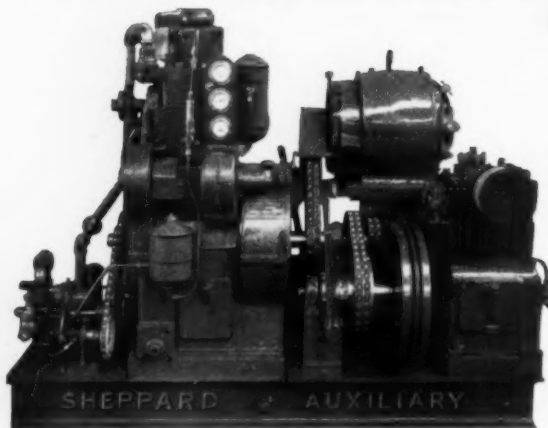
With Reserve Power



Sheppard Diesel Marine Auxiliary Units are designed and built to insure that extra power and stamina—always needed to meet the vicissitudes of weather—but doubly necessary in time of war. You can depend on Sheppard units to see your ship through again and again.



Write For Particulars



SHEPPARD *All American* DIESELS

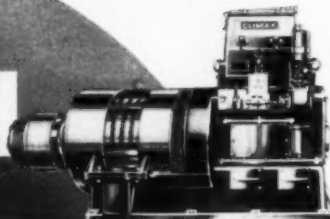
R. H. SHEPPARD COMPANY

HANOVER, PENNSYLVANIA

POWER & LIGHT

FOR LESS THAN

1 CENT PER KWH



Climax Diesels make Possible New and Broader uses for Diesel Engine Power

The dependable, low cost power delivered by Climax Diesels makes possible new and wider applications for Diesel power. At present their major use is to supply electricity where purchased power is costly or unavailable. Many users employ them for stand-by power and auxiliary service to reduce demand charges. Climax Diesels are used also for primary power in country homes, farms, ranches, garages and filling stations, hotels and hatcheries. Stores, markets, construction and oil field contractors are enthusiastic users of Climax Diesel electric plants.

Ratings and Design Features

Climax Diesels are solid injection, compression ignition engines of the four stroke cycle type. Two models are now in production: Model D 148 is a two cylinder engine with a maximum rating of 22 hp. and will drive a 15 KVA. generator. Model

D 297 is a four cylinder engine with a maximum rating of 44 hp. and may be used to power a 30 KVA. generator.

Quick cold starting, without pre-heating devices of any kind, is supplied by the electric starting system, on the unit or from a remote point.

Climax Diesels are simply designed, precision built yet easy to understand. Minor adjustments and repairs can be made by anyone familiar with standard gasoline driven engines.

WRITE for Climax Diesel Engine Bulletins

Bulletins are available for each Climax Diesel engine, contain specifications, performance curves, dimensional drawings, accessory equipment and complete description.

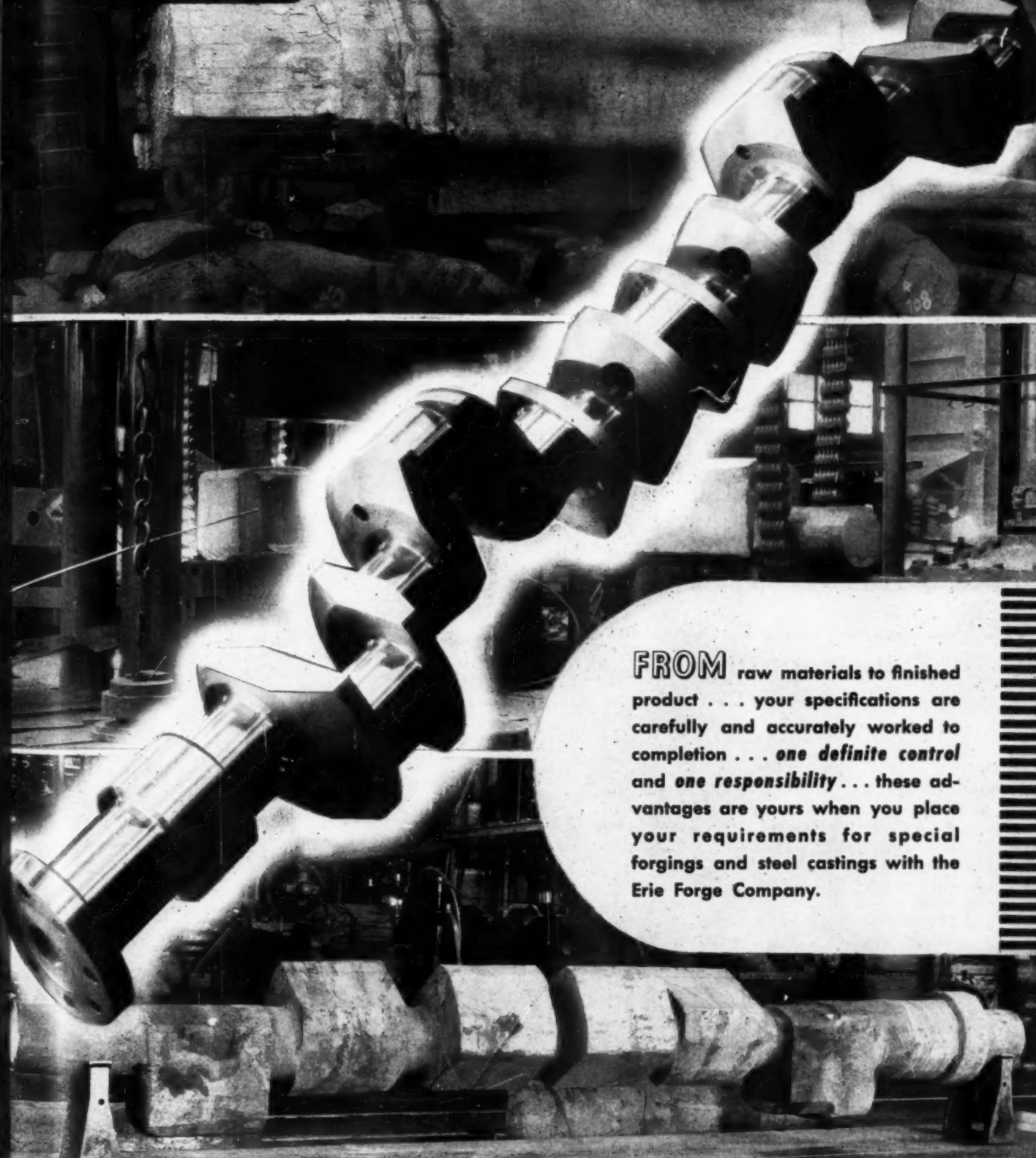


Climax

Engineering Company

GENERAL OFFICES & FACTORY: CLINTON, IOWA
REGIONAL OFFICES: CHICAGO, ILL., DALLAS, TEXAS

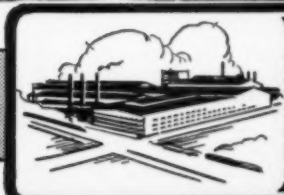
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FROM raw materials to finished product . . . your specifications are carefully and accurately worked to completion . . . *one definite control* and *one responsibility* . . . these advantages are yours when you place your requirements for special forgings and steel castings with the Erie Forge Company.



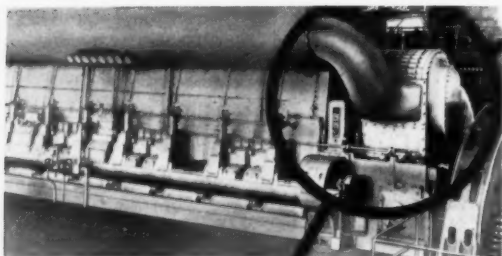
ERIE FORGE COMPANY, ERIE, PA.



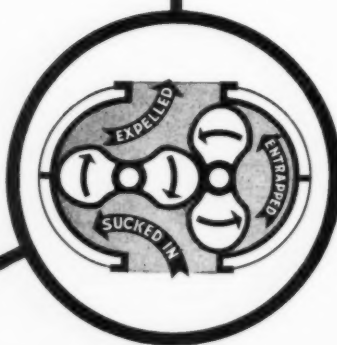
Economical AIR SUPPLY for DIESELS

Roots-Connersville Positive Displacement Blowers, direct driven from Diesels, are designed to match a particular engine, and have the characteristics needed to give best engine performance at all operating speeds. "R-C" Positive Displacement Blowers are especially effective for supercharging because of their automatic pressure build up feature. Specially designed units can be furnished for installations requiring minimum space and weight. Consult us regarding your air supply problems.

ROOTS-CONNERSVILLE BLOWER CORP.
402 Midland Ave., Connersville, Ind.



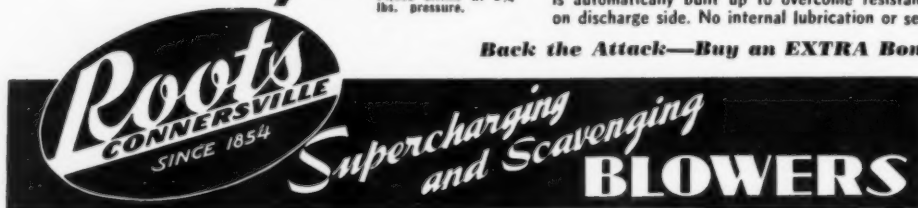
"R-C" Scavenging Blower delivering 14,000 c.f.m. at 254 lbs. pressure.



POSITIVE DISPLACEMENT

The principle is simple and effective. Twin impellers, mounted on parallel shafts, are rotated in opposite directions by a pair of gears. Each impeller alternately sucks in, momentarily entraps, and then expels a definitely measured amount of air or gas, resulting in the delivery of four equal predetermined volumes each revolution. Capacity varies with the speed. Pressure is automatically built up to overcome resistance on discharge side. No internal lubrication or seal.

Back the Attack—Buy an EXTRA Bond



PUTTING A NEW "HEX" ON PRODUCTION PROBLEMS

The ROL-TOP "hex" nut is a new application of the Boots principle of self-locking nuts which assures vibration-proof connections.

Because of the recognized efficiency of the ROL-TOP, design engineers are specifying it for application wherever self-locking devices are desirable.

Specially planned and built for heavy duty, the ROL-TOP Nut resists heat, air, gasoline and other destructive elements which make ordinary non-metallic devices inapplicable.

Boots one-piece, all-metal, self-locking nuts pass all government requirements.

SEND FOR CATALOGUE

BOOTS

BOOTS AIRCRAFT NUT CORPORATION ★ GENERAL OFFICES, NEW CANAAN, CONNECTICUT

equipment is not contemplated because of the present heavy pressure on the industry for delivery of existing hydraulic control and allied items now being manufactured for military aircraft. Commander Goodenough's first assignments will be on various fuel and injection problems connected with this equipment.



Wing Commander J. G. Goodenough

Before joining Adel, Commander Goodenough was in charge of power plant development in the Royal Canadian Air Force, specializing in research on winterization problems. In addition to a military background dating back to pilot officer days in the R.A.F. during World War I, Goodenough's commercial engine designing and manufacturing experience is extensive. Before joining the R.C.A.F. he was general manager of Dorman, Long and Co., Ltd., one of the largest engineering firms in the British Empire. Prior to that he was for many years associated with H. R. Ricardo, acknowledged world authority on internal combustion engines.

Decision to enter the Diesel equipment field was made after extensive survey of various proprietary items for which Adel's precision production equipment could be applicable including a two year study of American and foreign patents, product performance and production methods.

Initiation of early plans for the new division was believed necessary to assure execution of Diesel engineering and research projects with the same exhaustive study and thoroughness which has characterized Adel hydraulic products. If possible, design simplicity, precision production and maximum dependability are to be stressed in this division to an even greater degree than in the present hydraulic division. Since a program of this type involves extensive



...YOUR 4TH WAR LOAN QUOTA

WHETHER your plant meets its quota, or fails, lies largely in your hands. Your leadership can put it over—but if you haven't already got a smooth running, hard hitting War Loan Organization at work in your plant, there's not a minute to lose.

Take over the active direction of this drive to meet—and break—your plant's quota. And see to it that every one of your associates, from plant superintendent to foreman, goes all-out for Victory!

To meet your plant's quota means that you'll have to hold your present Pay-Roll Deduction Plan payments at their all-time high—plus such additional amounts as your local War Finance Committee has assigned to you. In most cases this will mean the sale of at least one \$100 bond per worker. It means having a fast-cracking sales organization, geared to reach personally and effectively every individual in your plant. And it means hammering right along until you've reached a 100% record in those extra \$100—or better—bonds!

And while you're at it, now's a good time to check those special cases—growing more numerous every day—where increased family incomes make possible, and imperative, far greater than usual investment through your plant's Pay-Roll Deduction Plan. Indeed, so common are the cases of two, three, or even more, wage-earners in a single family, that you'll do well to forget having ever heard of '10%' as a reasonable investment. Why, for thousands of these 'multiple-income' families 10% or 15% represents but a paltry fraction of an investment which should be running at 25%, 50%, or more!

After the way you've gone at your wartime production quotas—and topped them every time—you're certainly not going to let anything stand in the way of your plant's breaking its quota for the 4th War Loan! Particularly since all you are being asked to do is to sell your own people the finest investment in the world—their own share in Victory!

LET'S ALL

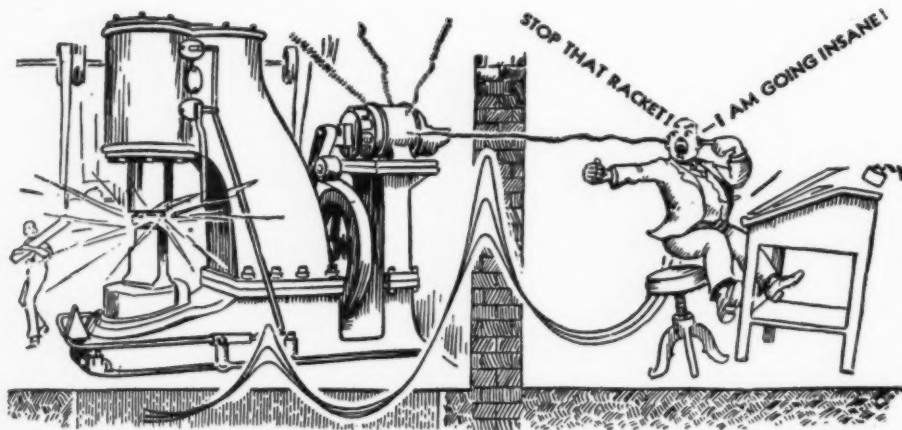
BACK THE ATTACK!

This space contributed to Victory by

R. H. T. Tamm

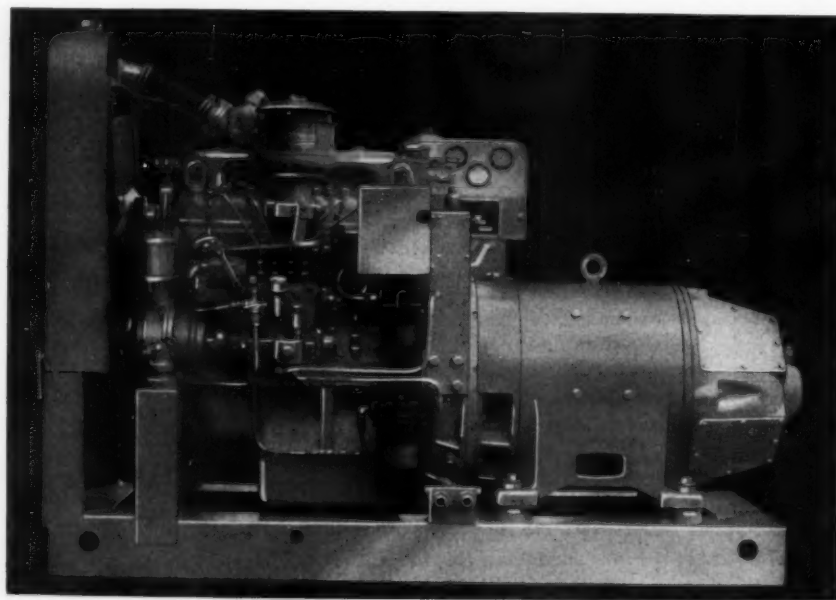
Editor—DIESEL PROGRESS

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council.



VIBRATION and NOISE CONTROL

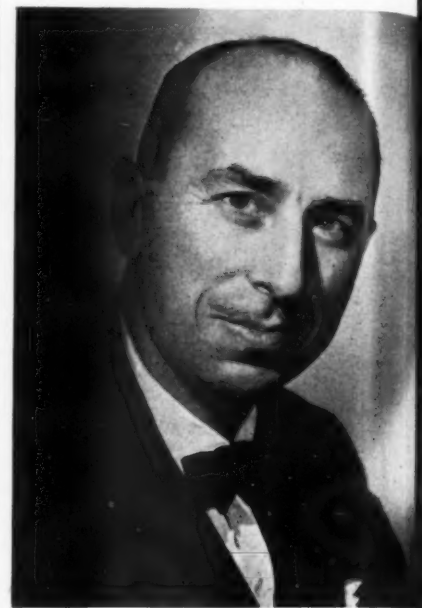
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CHICAGO



ENGINE GENERATOR SETS
5 KW. TO 100 KW.

Duplex Truck Co.
Lansing, Michigan

research and initial production tooling studies it is anticipated that production capacity, either at Adel or subcontract sources will undoubtedly be available substantially prior to the completion of presently contemplated projects.



Raymond J. Kirkby

Ellinwood also announced the appointment of Raymond J. Kirkby as special research and development engineer on hydraulic and pumping equipment. For the past three years, Mr. Kirkby has been chief engineer and manager of research and development of the Tokheim Oil Tank and Pump Co., Ft. Wayne, Indiana. Prior to that he was with the Crane Company, Chicago, for four years as engineer in charge of pump development.

A specialist in fluid conduction, he is a graduate of Bancroft College, London, England, and holds many patents in hydraulics and mechanical devices. Since the outbreak of War his work on ordnance materiel has included aircraft and ground fuel transfer pumps; and oiling and fueling equipment.

Robert M. Thomas Named Sales Manager of Perfect Circle Automotive Equipment Division

LOTHAIR TEETOR, President of The Perfect Circle Companies, Hagerstown, Indiana and Toronto, Canada, has announced the appointment of Robert M. Thomas as Sales Manager of the U. S. Company's Automotive Equipment Division. Mr. Thomas, until his new appointment, was Vice-President and Secretary of The Perfect Circle Company, Ltd.

Mr. Teetor also announced that Mr. Thomas will continue as a Director and Vice-President

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A UNITED ST

RONALD
McLEOD



SURE, that Saturday night pay envelope's bulging. But let me tell you something, brother, before you spend a dime . . . *That money's mine too!*

I can take it. The mess out here. And missing my wife and kid.

What I *can't* take is you making it tougher for me. Or my widow, if that's how it goes. And brother, it *will* make it tough—if you splurge one dime tonight. You're making money. More money than there's stuff to buy. Money that can sock the cost of living to kingdom come—if you blow it! So hang on, till the job's done. On to every last dime—till the squeal means a hole in the seat of your pants!

You're working . . . and I'm fighting . . . for the same thing. But you could lose it for both of us—without thinking. A guy like you could start bidding me right out of the picture tonight. And my wife and kid. There not

being as much as everybody'd like to buy—and you having the green stuff. But remember this, brother—everything you buy helps to send prices kiting. Up. UP. AND UP. Till that fat pay envelope can't buy you a square meal.

Stop spending. For yourself. *Your* kids. And mine. That, brother, is sense. Not sacrifice.

Know what I'd do with that dough . . . if I'd the luck to have it?

I'd buy War Bonds—and, God, would I hang on to them! (Bonds buy guns—and give you four bucks for your three!) . . . I'd pay back that insurance loan from when Mollie had the baby . . . I'd pony up for taxes cheerfully (knowing they're the cheapest way to pay for this war) . . . I'd sock some in the savings bank, while I could . . . I'd lift a load off my mind with more life insurance.

And I wouldn't buy a shoelace till I'd

looked myself square in the eye and knew I couldn't do without. (You get to knowin'—out here—what you can do without.)

I wouldn't try to profit from this war—and I wouldn't ask more for anything I had to sell—seeing we're all in this together.

I've got your future in my rifle hand, brother. But you've got both of ours, in the inside of that stuffed-up envelope. You and all the other guys that are lookin' at the Main Street shops tonight.

Squeeze that money, brother. It's got blood on it.

Use it up . . . wear it out,
make it do . . . or do without

**HELP
US
KEEP**

PRICES DOWN

A UNITED STATES WAR MESSAGE PREPARED BY THE WAR ADVERTISING COUNCIL; APPROVED BY THE OFFICE OF WAR INFORMATION; AND CONTRIBUTED BY THE MAGAZINE PUBLISHERS OF AMERICA



To speed victory you must also speed-up transportation by speeding up motor reconditioning. To do this — to get maximum engine performance and operating efficiency — get HALL Valve Servicing Equipment. Write the factory today for complete information on HALL ECCENTRIC Valve Seat Grinders and wet type Valve Relacers.

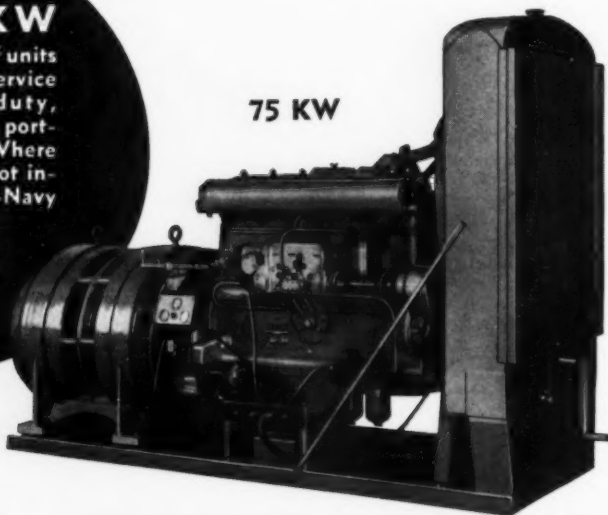
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Complete range of units for all types of service — continuous duty, stand-by, marine, portable, and others. Where production does not interfere with Army-Navy requirements, available on priority of AA3 or better.

75 KW



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OSHKOSH
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U.S. DIESEL

ELECTRIC PLANTS

of the Canadian Company.

Mr. Charles E. McTavish, formerly Director of Parts & Service of General Motors Corporation, Oshawa, Canada, succeeds Mr. Thomas and has assumed executive management of The Perfect Circle Company, Ltd. as General Manager and Secretary.

August H. Henrich Joins Auto Diesel Piston Ring Co.

MR. AUGUST H. HENRICH is now associated with The Auto-Diesel Piston Ring Co. of 3145 Superior Avenue, Cleveland, Ohio. He is assistant to the Vice-President and the General Manager. Mr. Henrich was formerly in the Experimental Department of the Thompson Products, Inc., Cleveland, Ohio. He has been associated with the Cleveland Tractor Company and the Pipe Machinery Company in experimental work and was superintendent of the Enterprise Tool Company. Mr. Henrich also operated his own tool manufacturing and jobbing business and is a member of the American Society Tool Engineers and the Cleveland Engineering Society.

New Diesel Generator Set Saves Space

A NEW compact, light-weight marine Diesel generator set is now being offered by Lister-Blackstone, Inc. The unit consists of a model CD, 8 hp., 1200 rpm. Diesel engine, close coupled to a 4½ kw. marine type generator of any desired voltage characteristics.

The complete assembly, including water circulating pump, fuel oil filter and hand starting system, weighs only 1195 pounds. Extremely compact, the assembly is only 45 inches long, 31 inches high and 25 inches wide.

A full line of units from 2½ to 10 kw. in this new design is available, as well as combination auxiliaries embodying air compressor generator and water pump in a wide range of types, the company announces.

West Coast Diesel News

By JIM MEDFORD

THE first of the Mikimiki type of seagoing tug for the Army transport, the 126-foot LT-112 with twin 560-hp. Fairbanks-Morse Diesel engines, has been delivered by the Barbee Marine Yards, Seattle, Washington.

CONSTRUCTED by Anderson and Cristofani of San Francisco, California, the 78-foot General Vandegrift, a purse seiner, has for main power

Volume E
CATALOG
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DIESEL ENGINE CATALOG

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Volume Eight of the DIESEL ENGINE CATALOG, edited by Rex W. Wadman is now available. Completely revised, this book contains the description and detailed specifications of One Hundred and Sixty-two engines. Nothing like it published. The most useful Diesel book available, containing a complete cross section of this rapidly expanding industry, in so far as the engines and accessories available are concerned. An indispensable book for all interested in Diesel engines.

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SINCE 1906
GASKETS
THE COMPLETE LINE THAT COMPLETELY SATISFIES

a 250-hp. Union, direct reversible Diesel.

FOR Otto Scott by the Van Camp Sea Food Co., Terminal Island, California, the 55-foot seiner *Brisky* has been repowered by the Shepherd Diesel Marine with a Caterpillar 115-hp. Diesel and Twin Disc gears.

TWIN Buda Diesels of 180 hp. with Twin Disc 3 to 1 reduction gears were installed in the 80-foot U. S. Engineer's survey boat *Kalama* by the Lake Washington Shipyards turning a single shaft through multiple V-belts. Auxiliary is also a Buda Diesel.

HERE another of the smaller type of California fish boat gets a Diesel: the 35-foot *June*, Ben Glazner of San Diego; a 6/60 hp. Caterpillar with Twin Disc gears swinging a 34 by 28 Lambie wheel.

FOR the Army's 114-foot combination freight vessels, the Petrich Shipyards, Tacoma, Washington, have selected twin Atlas Imperial 320 hp. Diesels; Coolidge wheels and Philco batteries have been selected.

FROM the Birchfield Shipyards, Tacoma, Washington, a new 99-foot freighter with 8-cylinder, 350-hp. Superior Diesel, Monel shaft, Goodrich cutlass rubber bearings and a Buda auxiliary Diesel has been delivered to the Army Transport Service.

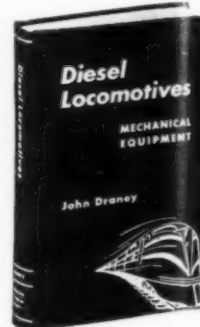
SANTA Barbara, California, fishing fleet has gone all out for Caterpillar Diesels. The Shepherd Diesel Marine announces the installation of one each in the *Northwest*, *Doreen*, and *Santa Lucia*, all with Twin Disc gears.

AT the Peyton Company's Newport Harbor, California, yards, a new 110-foot sub-chaser has been launched, powered with twin General Motors 1,200-hp. pancake Diesels with vertical crankshafts and reversible propellers.

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FOR TANK GAUGING EQUIPMENT FOR
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Past President, United Association of
Railroad Veterans

In collaboration with Diesel technicians from
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Works; Electromotive Division of General
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Cooper-Bessemer Diesel—American Locomotive
(McIntosh & Seymour)—Baldwin Locomotive
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Safer Way To De-Scale Diesel Cooling Systems

With Diesel engines being put to harder and longer use these war days, it means that insulating lime-scale and rust deposits build-up faster in your Diesel cooling system, thus impairing its heat transfer efficiency. You will find, however, that **FAST-WORKING** Oakite Compound No. 32 is the **RIGHT ANSWER** to this problem.

Far safer to use than commercial raw acids, it does **NOT** harm sound basis metal . . . leaves surfaces **CLEAN**, scale-free . . . restores normal cooling efficiency. Write for **FREE**, 28-page manual giving details!

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BUCKEYE RELINER PRODUCING CO.
LIMA OHIO

THE Wilmington Boat Works (California), old established yacht builders, are now turning out the 96-foot combination tug-freighters for the Army Transport Service. Main engines are 550-hp. Cooper-Bessemer.

LAUNCHED by the Curtola Boatworks, Oakland, California, the new 65-foot trawler *Admiral King*, powered with a 110-hp. Union Diesel, is owned by Vinc Cardinalli and Vic Palestrino.

LARGER quarters are made necessary by the growing demand for Atlas Imperial Diesels in the Los Angeles, California, harbor and Southern district, hence the company announces moving to 1046 Seaside Street, Terminal Island, with head man, the well known Jimmie Flynn.

ANOTHER repower job in the San Pedro, California, harbor fleet is the French Sardine Co.'s *Cesare Augusta* with a Fairbanks-Morse 30-hp. marine Diesel engine.

ON San Francisco Bay, Caterpillar Diesels are becoming increasingly popular. The new 87-foot V-bottom (unique in this size fish boat) seiner *Fleetwood* has two 135-hp. engines with chain drive to single shaft turning 425 rpm.

ANOTHER San Francisco Bay yard, the George Kneass, has completed a 80-foot seiner for Frank Gandolpho powered with a six-cylinder, 250 hp. at 400 rpm. Enterprise Diesel.

AND to make a pair of Enterprise installations, at Monterey, California, A. N. Lucido is the proud owner of a new 78-foot seiner with a 10½ by 12 Enterprise Diesel rated 250 hp. at 400 rpm.

BRITISH Columbia Packers, Vancouver, B. C., plan a 85-foot seiner, the largest in these waters, to be powered with twin Caterpillar Diesels using chain drive to main shaft with Fast couplings.

DIESEL ENGINES

Large selection—All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—also boilers, steam engines, turbo generators.

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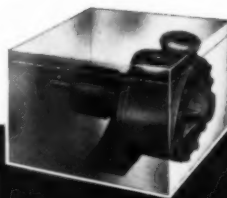
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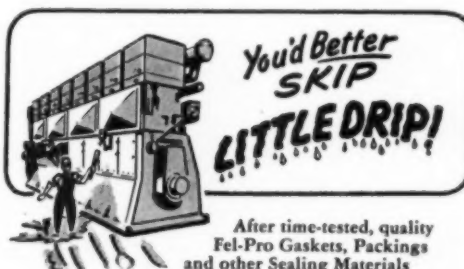
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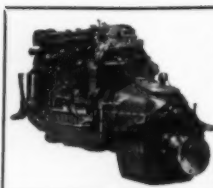
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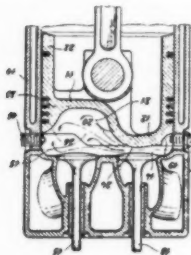
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2,323,028

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Wilhelm Glamann, Stuttgart, Germany; vested in the Alien Property Custodian
Application June 28, 1940, Serial No. 342,882
In Germany April 27, 1939
2 Claims. (Cl. 123-32)



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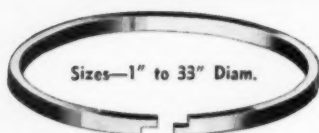
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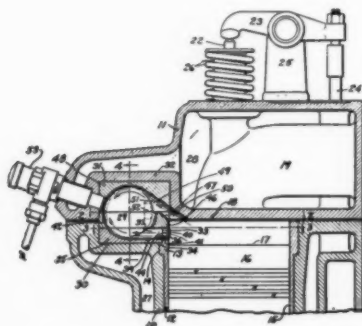
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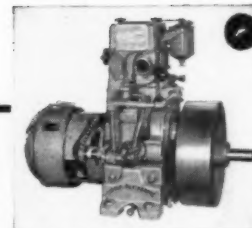
2,316,794
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 George T. Johnson, Denver, Colo.
 Application July 24, 1941, Serial No. 403,791
 4 Claims. (Cl. 123-32)



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